Nepal Orthodox Tea: Analysis of industry, production, and market potential

By

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Abstract

This study covers industry analysis, financial analysis and market analysis of Nepal orthodox tea. It aims to evaluate the industry forces, analyze the financial performance of firms, and assess market potential. The study is based on field survey, key informants' interviews, and participant observation in combination with data from secondary sources. The financial information of 65 tea processing firms was collected using standard financial formats. The production and trade related statistical data were obtained from National Tea and Coffee Development Board Nepal, Trade and Export Promotion Center Nepal, FAOSTAT, International Trade Center and STATISTA.

The results of industry analysis indicate that in general, tea processors have low bargaining power against input suppliers and tea buyers. The processing industry was found to be less attractive for new entrants. The threat of substitutes was found to be low. But there is intense internal competition among processing firms for resources and markets. Limited and inefficient production, low economies of scale, unorganized supply chain system, limited access to global market are the major binding constraints identified by this study.

The results of the financial analysis found positive returns of investment and increasing returns to scale. However, the average capacity utilization of the processing firms is found to be 33 percent. A Cobb-Douglas production function was used to estimate production potential and the result depicted that a one percent increase in the investment in capital, labor and raw material could increase revenue by 0.20 percent, 0.12 percent and 0.68 percent respectively. Thus, this study revealed that the processing firms can decrease processing costs and increase profits by expanding production. The total factor productivity is found to be 3.67 which is the growth of real output not explained by the increase in capital and labor used in the production.

The global tea market is growing at the annual compound growth rate of 3.4 percent by volume, 5.7 percent by price and 9.3 percent by value. About 79 percent of the consumers who purchased Nepalese tea rated it excellent. This study informs that there is a promising export potential due to increased demand, competitive price, unique taste and quality products. However, the study shows that about 90 percent of the total exports go to the low-priced Indian market and only 10 percent are exported to premium market. The analysis indicates that China, India, Sri Lanka and Kenya are the major competitor of Nepal. Similarly, Pakistan, Russia, UAE and Morocco are potential markets for volume export whereas European countries and North America are potential lucrative markets for specialty Nepalese tea. As a result of foregoing it is recommended that Nepalese exporters diversify and differentiate their market to enhance their profit potential. The findings of this study are particularly relevant to the Nepalese tea processors to improve their competitiveness, production efficiencies, and market share.

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Abbreviation

ADS	Agriculture Development Strategy
CTC	Crush, tear and curl
CTCF	Central Tea Cooperative Federation Ltd
CAGR	Compound Annual Growth Rate
DANIDA	Danish International Development Agency
DFTQC	Department of Food Technology and Quality Control
FAOSTAT	Statistics of Food and Agriculture Organization of the United Nations
FNCCI	Federation of Nepalese Chambers of Commerce and Industry
HIMCOOP	Himalayan Tea Producers Cooperative Ltd
HOTPA	Himalayan Orthodox Tea Producers' Association
IMO	Institute of Marketecology
ITC	International Trade Centre
Kg	Kilogram
MOAD	Ministry of Agricultural Development
MOC	Ministry of Commerce
MOF	Ministry of Finance
NARC	Nepal Agricultural Research Council
NASAA	National Association for Sustainable Agriculture Australia
NGDP	National Gross Domestic Product
NTCDB	National Tea and Coffee Development Board
NTDC	Nepal Tea Development Corporation Ltd
NTIS	Nepal Trade Integration Strategy
NTPA	Nepal Tea Planters Association
RTD	Ready To Drink
SNV	SNV Netherlands Development Organization
STAN	Specialty Tea Association of Nepal
TEPC	Trade and Export Promotion Centre
UNDESAPD	United Nations, Department of Economic and Social Affairs, Population Division
USAID	United States Agency for International Development

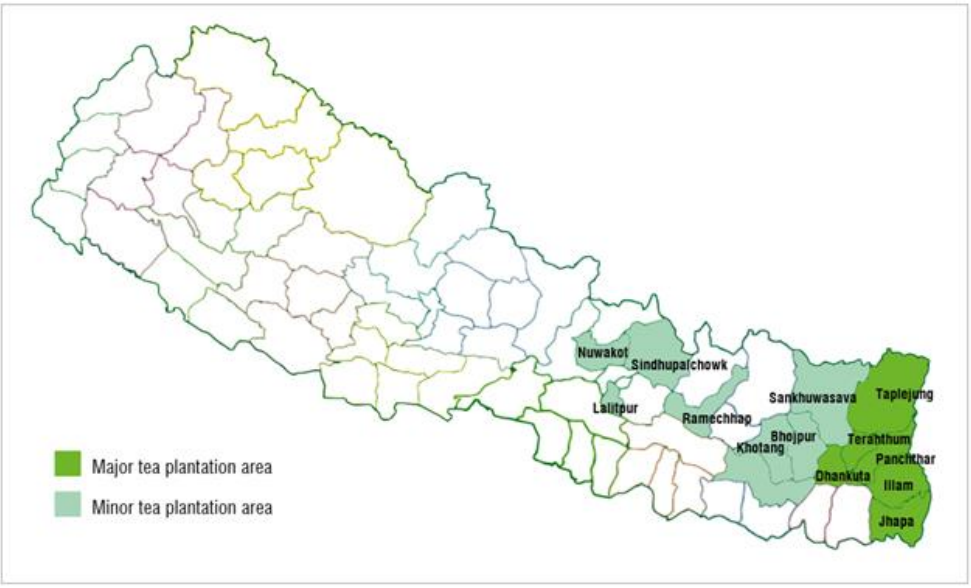
Chapter 1: Introduction

1.1 Overview of Nepal Tea Industry

Nepal is a small agricultural country located in South Asia. The country has almost 30 million population (UNDESAPD, 2019) with agriculture being the main source of income for 73.9 percent of the total population (ILO, 2018). The nation had an economic growth rate of 6.7 percent in 2018 and is expected to reach 7 percent in 2019 (ADB, 2019). The growth rate is mainly driven by the service and agriculture sectors (Ezemenari et al., 2019). The contribution of the agriculture sector to the national GDP was 27 percent in the fiscal year 2018/19 (MOF, 2019). The diverse agro-ecological zones found within the area of 147,181 square kilometers and the topography ranges from 70 to 8848 meters above sea level offer an ideal production environment for a variety of crops as well as livestock production and diversification.

Tea (*Camellia sinensis*) is the second most consumed beverage in the world after water (Martin, 2007). It is widely consumed as a hot or cold drink. It is one of the major high value export commodities of Nepal that contributes about 0.01% to the NGDP (Tiwari, et al., 2018). The statistics of the National Tea and Coffee Development Board (NTCDB) shows that over 15,000 tea farmers are smallholder farmers whose role has been crucial for the growth of the tea industry in Nepal. Approximately, 70,000 people are working directly and indirectly in this industry with majority of them being rural women (ITC, 2017). The history shows that the commercialization of tea in Nepal started from the late twenty century. According to NTCDB, the first commercial tea plantation was started in Jhapa by Budhkaran Tea Estate and the first tea processing factory was established in 1978 in Ilam by Nepal Tea Development Corporation (NTDC). In the year 1982, the Government of Nepal declared five districts of eastern Nepal (Jhapa, Ilam, Panchthar, Dhankuta, and Terathum) as tea zones. The National Tea and Coffee Development Board

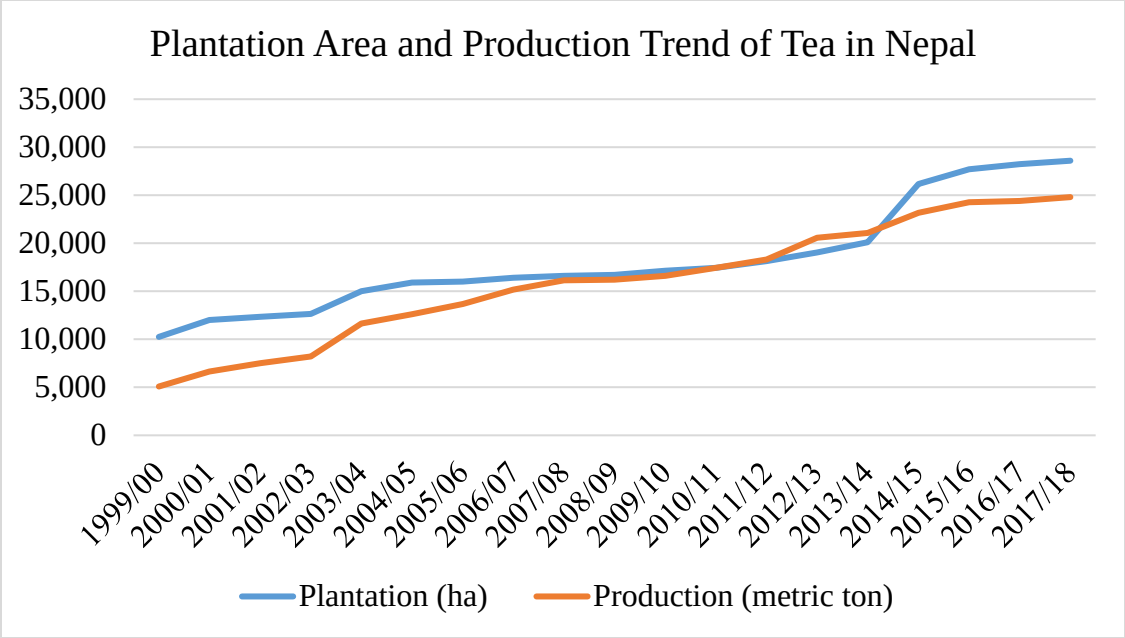
established in 1993 with the aim of tea and coffee sector development through technical support, policy formulation and implementation. National Tea Policy was formulated in 2000 to support tea sector development and the government accepted and adopted it in 2002.



Source: International Trade Center, 2017

Figure 1: Map of Nepal Showing Tea Production Area

The two varieties of tea; i) *Camellia sinensis* var. *assamica* and ii) *Camellia sinensis* var *sinensis*, are grown in Nepal. Different cultivars of *Camellia sinensis* var. *assamica* are grown in the Terai region (altitude below 500 meters) and are particularly used for making CTC tea. Similarly, *Camellia sinensis* var. *sinensis* is grown in the hilly areas (altitude above 800 meters from sea level) and are particularly used for making orthodox Tea. The CTC tea is processed by crushing, tearing and curling into a small granular form. It is mostly consumed with milk and known as milk tea or English breakfast tea. Orthodox tea is processed by plucking of bud and 2-3 upper succulent leaves, withering, rolling, oxidation and/or fermentation, drying, grading, and packaging. In remote areas, small processors also use traditional processing method where all steps are done manually by hand which is called handmade orthodox tea.

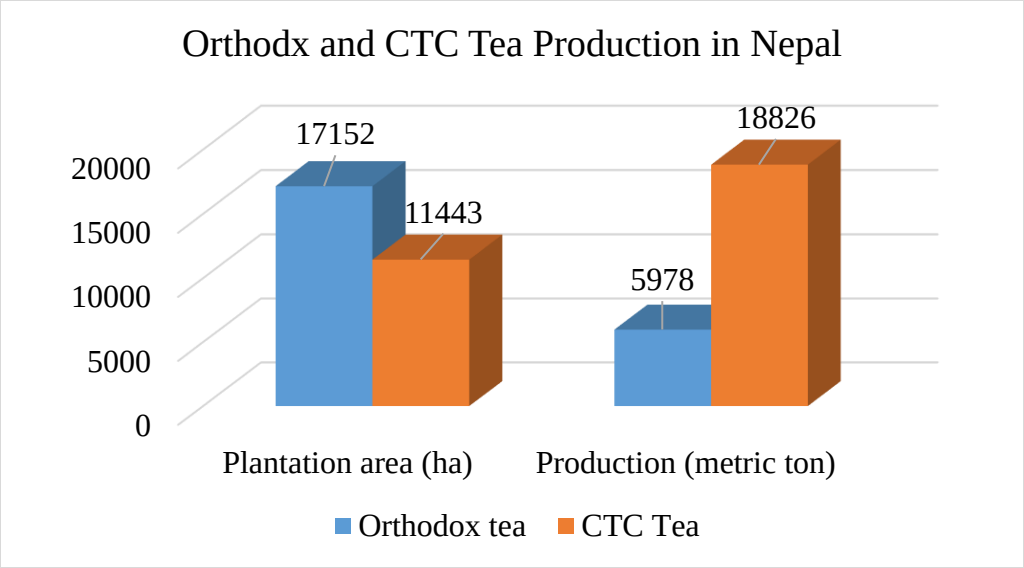


Source: NTCDB 2019

Figure 2: Plantation Area and Production of Tea in Nepal from FY 1999/00 to 2017/18

Figure 2 illustrates that the plantation area and production are continuously increasing every year. The total tea plantation area was increased from 10,249 hectares in 1999 to 28,595 hectares in 2018 and production from 5,085 to 24,804 metric tons (Appendix A).

Similarly, Figure 3 illustrates the plantation area and production of CTC and orthodox tea in Nepal in 2018. The data shows that the production area of CTC tea is lower than orthodox tea, but the production is higher than orthodox tea. Normally, four to five younger leaves are plucked for CTC tea while only 2 to 3 leaves are plucked for orthodox tea production. Similarly, the *assamica* variety has bigger leaves than *sinensis*. Moreover, the CTC tea is produced in irrigated and fertile land in the plain area whereas orthodox tea is grown in the non-irrigated hilly area. These reasons might contribute to the low production of orthodox tea. However, the data available in general seems to be inaccurate because Nepal and India have open boarder where a large quantity of tea goes to India unofficially and without record keeping (Warakaulle et al., 2007).



Source: NTCDB, 2019

Figure 3: Orthodox and CTC Tea Production in Nepal in 2018

At present, more than 15,000 small farmers and about 152 processing firms (120 orthodox and 32 CTC factories) are engaged in producing various types and grades of CTC and orthodox tea. Black, green, oolong and white teas are the common orthodox tea produced in the country.

1.2 Rationale of the Study

Tea requires a warm and humid climate with plenty of rainfall, slightly acidic soil and long duration sunlight which are available in the eastern part of Nepal. High altitude, highly diversified agroecology, pollution free cool and moist environment, availability of abundant natural resources including organic soil and mineral water, cheap labor and land are the favorable environment to produce distinctive tea in Nepal. However, the country has limited production. The total production is only 0.28 percent of world tea production (FAOSTAT, 2019).

During the last decade, the Government of Nepal and various other development organizations have been supporting for the commercialization of Nepalese tea. National Trade Integration Strategy 2016 has identified the tea as one of the major exportable commodities and

included it as one of the top 19th priority products for export from Nepal (MOC, 2016). The Trade Policy 2015 and the Agricultural Development Strategy 2015-2035 have also given priority for the commercialization and export promotion of Nepalese tea (MOAD, 2014). The NTCDB has established seven tea extension offices in the tea plantation districts from where tea growers get technical support. Besides, NTCDB, several other development partners like Danish Development Cooperation (DANIDA), U.S. Agency for International Development (USAID), Netherlands Development Organization (SNV), German Society for International Cooperation (GIZ), International Labor Organization (ILO), and International Trade Center (ITC) have been supporting for the tea sector development. Similarly, commodity associations like Central Tea Cooperative Federation (CTCF), Specialty Tea Producers Association (STAN), Himalayan Tea Producers Association (HOTPA), Nepal Tea Planters Association (NTPA), Suryodaya Tea Producers Association, and Nepal Tea Producers Association are working for the welfare of tea farmers, processors, and traders.

Additionally, the TEPC and NTCDB database shows that the export has been increasing continuously since 2004. The export value in 2018 was recorded at 31.51 million US dollars. Moreover, the production of different types of specialty tea at high altitude by small artisan farmers has made Nepal tea a rare and exotic product. Their products have been awarded as first or second or third position in different categories in the global tea competition since 2012 (Table-12). Despite promising export potential, Nepal tea has limited access to premium markets. Being a member of World Trade Organization, Nepal has not been able to utilize international trade opportunities properly. The tea processors are still depending on middlemen to sell their premium products to the global market. The pricing mechanism is based on negotiation.

There are a number of studies conducted on the orthodox tea value chain, but a comprehensive economic analysis of the Nepalese orthodox tea industry, production, and market potential has not been published yet, to the best of author's knowledge. The United States Agency for International Development (USAID) funded Nepal Economic, Agriculture, and Trade Activity (NEAT) studied a value chain analysis of the orthodox tea sub-sector in Nepal in 2011 but this study is confined to the existing production and marketing situation of Nepal tea only. Tiwari et al. (2018) studied the economics of orthodox tea production in Nepal and found that that the cost of production varies on the scale of production and location. Their study is confined to the cost and benefit analysis of tea leaves production. Adhikari et al. (2017) conducted the value chain analysis of Nepalese orthodox tea. Their study is focused on organic aspects only and has not conducted the detailed financial and market analysis.

The current study has conducted an economic analysis of Nepalese orthodox tea including financial analysis, industry analysis, and market analysis. More precisely, this study is aimed to answer the following research questions;

1. What are the major competitive forces affecting profitability of Nepal orthodox tea industry?
2. What are the major factors affecting profitability of Nepal orthodox tea processing firms?
3. What are the marketing trends and potential market for Nepalese orthodox tea?

The findings of this study will be relevant to the processors particularly in improving production and marketing efficiencies. More precisely, the findings of this study will help Nepalese tea processors to improve competitiveness, to optimize the use of production resources, to minimize production cost, to penetrate the target market and to maximize profit. Furthermore,

the insights generated by this study will inform management decisions of tea processing firms regarding annual planning, budgeting, price negotiation and market exploration. This study will also be useful to the buyers for product and price discovery, identifying appropriate suppliers and products. This study could also be relevant to the policymakers and development organization for tea sector development.

1.3 Objective of this Study

The main objective of this study is to conduct an economic analysis of the Nepalese orthodox tea industry that is useful to tea entrepreneurs for improving their performance and efficiency in production and marketing and for making economic decisions. The specific objectives of this study are;

- To assess the existing position of Nepalese tea industry
- To analyze and interpret the financial performance of the industry
- To explore the export potential and opportunities for new market penetration

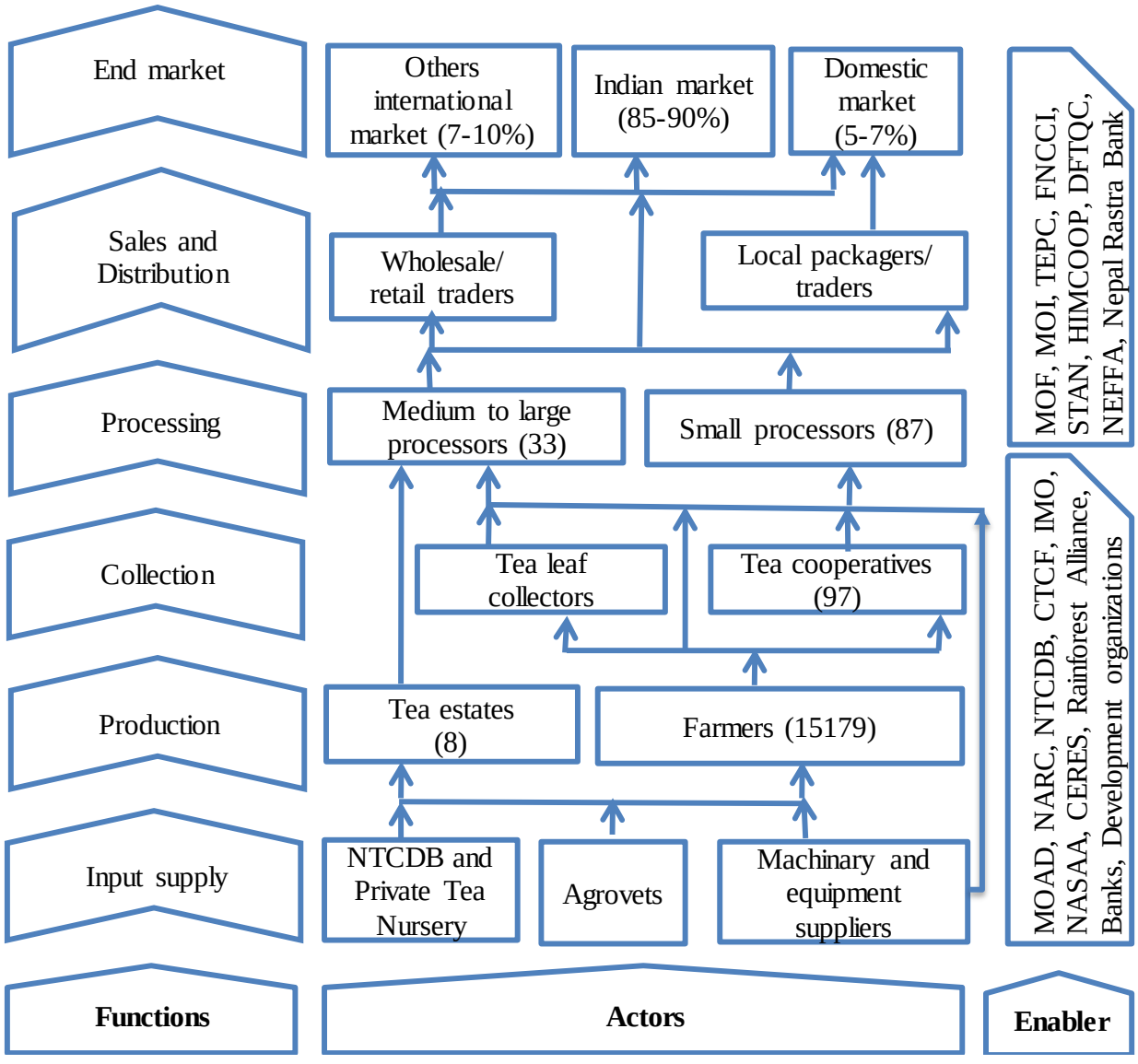
1.4 Limitations of the Study

- Very few research activities and reliable data are available about Nepal tea
- Data mentioned in various sources are not consistent and updated
- Difficult to obtain actual marketing cost and profit margin from buyers

Chapter 2: Analysis of Nepal Orthodox Tea Industry

1.1 Supply Chain Analysis

The flow diagram in Figure 4 illustrated the major actors, enablers and their functions exist in Nepal orthodox tea supply chain.



Source: Adapted from USAID (2011)

Figure 4: Supply Chain Mapping of Nepalese Orthodox Tea

From the field survey and stakeholders' consultation workshops, following supply chain actors and their activities were found and described in the following sections and sub-sections.

2.1.1 Actors

2.1.1.1 Input suppliers

Agro-vets, private tea nursery owners, NTCDB and Tea machine suppliers are the major input suppliers. Agro-vets are available at local markets who supply agro-chemicals, fertilizers, and small farm tools. Tea Extension Program of NTCDB, and some private nurseries produce saplings and distribute to the farmers. NTCDB is a government organization and has the team of technical experts who are providing technical services to the farmers. There is limited technical service providers at the private level. Sherma Trade Link is the only one tea processing machine supplier in the country who imports small Chinese machines from China and supplies to the small processors. The Chinese machine supplier has developed some technicians for the repair and maintenance of the Chinese machines. There are some Kolkata based Indian tea processing machine suppliers like Tea Mech India, Parucco India, Marshall Sons and Company India. They usually supply larger machines to large processors, particularly for making black tea.

2.1.1.2 Producers

According to the data maintained at NTCDB, there are 15,179 small farmers (having less than 2 hectares of land) and 8 private tea estates in Nepal. Tea farmers are normally affiliated in cooperative. There are 97 tea cooperatives who usually collect the green leaf from their member farmers and supply to the factories. Currently, 28 cooperatives have their own small processing firms who process green leaves themselves. Farmers supply their green leaves to the processing factories either directly or through cooperatives. Sometimes, farmers also sell their green leaves to the local collectors.

2.1.1.3 Green leaf collectors

There are some local middlemen who collect the green leaves from individual farmers and supply to the bought leaf factories on a commission basis. The normal commission rate is $0.01 per kg. Now, these types of collectors are gradually replaced by cooperative collection.

2.1.1.4 Processors

In total, 120 orthodox tea processors including small, medium or large are in operation as of 2018 (Appendix B). They are producing over 5,000 metric tons of tea annually. There is no clear demarcation between medium and large factories. Generally, there are 33 medium to large size factories that produce from 50 to 200 metric tons of different types and grades of orthodox tea per year. The majority of the processing factories buy green leaves from farmers. Only 8 factories have their own tea estate however they also buy green leaves from farmers. Similarly, there are 87 small processors including 28 cooperative factories who are producing up to 50 metric tons of processed tea per year. Out of the total, 20 processing firms and their growers are organically certified (Appendix D), and some other factories are under the certification process. Most of the processing firms are now operating below capacity.

2.1.1.5 Packagers

STAN and HIMCOOP are working as packagers and distributors. But there is no large-scale commercial packager in Nepal. Usually, the packaging is done by processors themselves. 20 kg paper sack is used for bulk supply whereas small packet ranges from 100 grams to 250 grams are normally packed for the domestic market. The small packing is done either by small processors themselves with their own brand name or by retailers with the retailer's brand.

2.1.1.6 Traders

Traders in this industry are either processors or small-scale packagers and retailers. Small-scale packagers and retailers buy the tea from processors and sell in the domestic market either with their own brand or with processors' brand. Exporters are mainly the larger processors and their associations (STAN and HIMCOOP). In the case of India, processors supply directly and individually. Small tea processors and cooperatives normally supply their tea in the domestic markets, particularly to the retailers. STAN has its own sales outlet in Kathmandu, Australia and the USA and is selling the tea produced by small processors and exporting tea to the overseas market. Similarly, CTCF has also supported their cooperative members for marketing their products as cooperative tea. Tea produced by large processors supplies to India in bulk and about 5-10 percent supplies to other countries. The majority of the conventional factories supply to India only. Some medium to large processors also export their tea through HIMCOOP who has a sales outlet in Lalitpur.

2.1.2 Enablers

2.1.2.1 Himalayan Tea Producers Association (HOTPA)

Himalayan Tea Producers Association (HOTPA) is the commodity association of 20 medium to large scale orthodox tea processers of Nepal. It was established in 1998 with the objective of improving the quality and market of Nepalese orthodox tea. Its head office is located at Bakhundol, Lalitpur. They are engaged in the market promotion, code of conduct implementation and national level advocacy, policy dialog and trade-related issues.

2.1.2.2 Central Tea Cooperative Federation Ltd. Nepal (CTCF)

Central Tea Cooperative Federation Ltd. Nepal (CTCF) is an umbrella organization of 97 orthodox tea producer cooperatives. It was established in 2010 with its head office in Ilam and

district offices in Ilam, Panchthar, Dhankuta, Terhathum, and Kathmandu. It is actively involved in the capacity building of tea cooperatives, technology dissemination to the cooperative farmers, market linkage and advocacy and lobbying activities at the local, regional, national and international level for the tea sector development in Nepal.

2.1.2.3 Specialty Tea Association of Nepal (STAN)

Specialty Tea Association of Nepal (STAN) is an umbrella organization of 46 small tea processors. It was established in 2012 with the aim of addressing problems faced by small tea processers and improving the quality and market of specialty tea produced by small processors. Its head office is in Kathmandu Nepal. STAN is now actively engaged in the marketing sector. It has its own marketing outlet in Kathmandu and business partners in Australia, USA and Canada from where tea produced by its members are marketing.

2.1.2.4 Himalayan Tea Producers Cooperative Ltd. (HIMCOOP)

It was established in 2003 as a marketing wing of HOTPA representing 20 medium to large processing firms. The main objective of HIMCOOP is to sell the tea produced by its members. It has a market outlet in Kathmandu. The HIMCOOP is selling tea to the domestic and international markets. It also sends samples and product information to the buyers. It has been operating by the membership fee and commission received from the sale.

2.1.2.5 Federation of Chambers of Commerce and Industry (FNCCI)

It is an umbrella organization of business in Nepal which includes 105 district/municipality level chambers, 100 commodity associations, 880 leading public and private sector undertakings and 2 bi-national chambers. It is working on the socio-economic development of the country through private sector-led economic growth. The Agriculture Enterprise Center (AEC) is the agricultural wings of FNCCI established in 1991 and working for the agribusiness development

and promotion sector. It collects various trade related information, organizes various programs and policy lobbying for private sector development. FNCCI has province and district chapters called District Chambers of Commerce and Industry (DCCI) who are working for the trade promotion, business facilitation, business networking and issuing of certificate of product origin for agricultural and industrial products produced in the country.

2.1.2.6 Ministry of Agriculture and Livestock Development (MoALD)

This ministry is responsible for agriculture policy formulation, program planning, budgeting and implementation, and monitoring of agriculture development related programs. The Department of Food Technology and Quality Control (FTQC), Nepal Agricultural Research Council (NARC), and National Tea and Coffee Development Board (NTCDB) are working under this ministry.

2.1.2.7 National Tea and Coffee Development Board (NTCDB)

It is a commodity board established by the Government of Nepal in 1993 under the Tea and Coffee Development Board Act 1992. The board is the sole regulatory body of the Tea sub-sector in Nepal and is responsible for the promotion and strengthening of the Tea. The major function of NTCDB are; policy implementation, planning, implementation of collective trademark, registering logo in importing countries, monitoring, technical and financial support, promotion, coordination, managing auction house, etc.

2.1.2.8 Nepal Agriculture Research Council (NARC)

It was established in 1991 as an autonomous organization under "Nepal Agricultural Research Council Act - 1991" with the aim of conducting qualitative research in the agriculture sector in the country. NARC is continuously conducting research works on various aspects of crop and

livestock sectors. It has many research stations and outreach programs. Recently, NARC Pakribas has started varietal selection on tea.

2.1.2.9 Ministry of Commerce, Trade and Export Promotion Center (TEPC)

It is a government organization under the Ministry of Commerce established in 2006 to facilitate trade and export. It supports the government for developing trade and export promotion related policies and strategies. It provides information about global trade scenario, trade data, support in international trade fairs and exhibitions. In 2017, TEPC in coordination with ITC prepared national sector strategy 2017-2021 for tea sector development.

2.1.2.10 Department of Food Technology and Quality Control (DFTQC)

It is a government organization and is responsible for food quality inspection, control, certification, food technology development, and extension, food security program implementation, lab analysis and other sanitary and phytosanitary measures related activities. The DFTQC has been providing various services to food industries like food quality test, food quality and food safety related capacity building programs, inspection and certification of food products in eastern Nepal.

2.1.2.11 Division Cooperative Office

It is also a government organization responsible for registration, monitoring, renewing, and capacity building of cooperatives.

2.1.2.12 Development organizations

Many international organizations and diplomatic missions have been supporting for the tea sector development in Nepal. Danish Development Cooperation (DANIDA) implemented a bilateral program called UNNATI Inclusive Growth Program in Nepal for the commercialization of orthodox tea from 2014 to 2018. The UNNATI program focused to improve productivity, quality and marketing of orthodox tea in Nepal. The program support included capacity building

of farmers and processors, machinery equipment, organic certification, rural road infrastructure support, financial linkage, policy dialog and market promotion. The United States Agency for International Development (USAID) supported to improve Nepalese tea business through Nepal Economic, Agriculture and Trade (NEAT) project from 2012-2015. The project particularly helped tea entrepreneurs with technology adaptation and international market linkage. Likewise, International Labor Organization (ILO) is dealing with the labor working condition in the tea industries for their decent work and working environment related issues including associated rights and standards. Agritera Netherland is working with cooperative for their capacity building including financial management, governance, business development and advocacy. Similarly, many other international organizations such as SNV Netherlands and Germany Development Cooperation (GIZ) also worked in the past for the value chain upgrading of Nepalese orthodox tea.

2.1.2.13 Financial Institutions

Nepal Ratra Bank, Nepal Bank Limited, Rastriya Banijya Bank, Agriculture Development Bank, Siddartha Development Bank, SBI Bank, Laxmi Bank, NMB Bank, Excel Development Bank, Machhapuchhre Bank, Nabil Bank and many microfinance institutions are providing loan for the tea entrepreneurs. The government provides subsidy of five percent of the interest in agricultural loans disbursed by banks and financial institutions.

2.1.2.14 Organic Certification Agencies

NASAA Australia, IMO India, CERES Germany and Rainforest Alliance are now working in the certification process. They do not have an office but have country representatives. The organic inspectors usually come from India and other countries. The average organic certification cost ranges from $6000 to $12000 per year. It depends on the number of farm coverage and the

certifying agent. Due to small scale production, the certification cost is expensive for small farmers and processors.

2.1.2.15 Transportation Companies

There are many transportation companies such as local transport companies who transport made tea throughout the country. There are 125 freight companies registered in Nepal Freight Forwards Association (NEFFA) who are providing outbound logistic services for export including custom clearance. The small quantity normally exported by air cargo from Kathmandu and the quantity above one metric ton exported by ship via Kolkata (India) port.

2.1.3 Products

Nepal is producing a wide range of made tea. Each firm has different products. The products are classified by the type of farming, seasonality, grade and manufacturing techniques.

2.1.3.1 By Farming System

A. ***Organic:*** There are 20 organically certified tea factories as of 2018 that are producing about 100 metric tons of organic certified tea in Nepal.

B. ***Organic by default:*** About 30 processing firms including their farmers are using traditional farming techniques using local organic inputs like compost, vermicompost and biopesticides. A negligible amount of mineral fertilizer is used but occasionally. The production under organic by default is about 700 metric tons per year.

C. ***Conventional:*** About 70 processing firms including associated farmers are producing tea using traditional farming techniques but use mineral fertilizers and chemical pesticides. The production under this system is about 5000 metric tons per year.

2.1.3.2 By Processing Season

A. ***Spring (First) Flush:*** Tea harvested from February to mid-April is called Spring flush tea. Tea produced in this season has the highest quality. The tea has light color and mild astringent flavor.

B. ***Summer (Second) Flush:*** Tea harvested in May and June is called Summer Flush tea. The quality is lower than the first flush. The tea has bright color and juicy flavor.

C. ***Monsoon (Third) Flush:*** Tea harvested from July to September is called monsoon flush. The quality is similar or lower than the second flush, but it has more astringent flavor.

D. ***Autumn (Fourth) flush:*** Tea grown in October and November is called Autumn flush tea. It has strong coppery color with more astringent flavor.

2.1.3.3 By Quality or Grade

A. ***Leaf Grade:*** It is the highest quality fine tea. It is commonly labeled by acronyms such as SFTGFOP, FTGFOP or TGFOP or FOP or OP or SF. The abbreviation S stands for Special, F stands for Finest, T stands for Tippy, G stands for the Golden meaning higher proportion of buds in the tea, F stands for Flowery means the tea has bud, O stands for Orange and P stands for Pekoe. The acronym SFTGFOP1 means Special Finest Tippy Golden Flowery Orange Pekoe made from only one succulent bud or first flush tea with one bud and one or two young leaves. It is top-grade tea. Normally, one bud and two very young leaves are used for processing. Around 2000-2500 metric tons of such leaf grade teas is produced every year.

B. ***Broken Grade:*** It is the second highest grade tea. It is labeled by the acronyms such as FBOP, GBOP, TGBOP, GBOP or BOP grades. The abbreviation B stands for broken and the meaning of rest abbreviation is the same as Leaf grade. TGBOP means Tippy Golden

Broken Orange Pekoe. Normally one bud and two leaves are used for processing. Around 2500-3000 metric tons of such grade of tea is produced per year.

C. ***Fanning:*** These are small pieces of tea leaves or dusts leftover after segregating leaf and broken grade tea. These are usually used for tea bagging. These grades are labeled by the acronym like OF, OPF, FBOPF. Around 1000 metric tons of such grade tea is produced each year. These are low grade and low-quality tea and do not export except to India.

D. ***Dust:*** These are tiny pieces of fanning are called dust and these are the lowest grade usually used for tea bagging or flavoring purpose. The acronyms used are PD, FD, GD. The PD means Pekoe Dust, FD means Fine Dust, GD means Golden Dust.

2.1.3.4 By Manufacturing Process

A. ***Black tea:*** The tea has black color. The normal process includes plucking, withering, rolling, oxidation, drying, sorting, grading and packaging and labeling. It is more popular in Russia and the USA. Medium and large processors usually produce black tea using Indian machines.

B. ***Green tea:*** It looks like the green color. The normal process involves short withering and very short oxidation either by steaming or roasting, rolling, drying, sorting, grading, packaging and labeling. It contains more polyphenols because of less rupture of cells and less caffeine. This is normally exported to China, Taiwan, Europe, and Japan. This tea is normally produced by small processors using Chinese machines.

C. ***Oolong tea:*** This is specialty tea produced in small quantities (<25 metric tons). The process is same as Green tea where oxidation time is less than Green. The demand for this tea is more in China, Korea, Japan and Taiwan.

D. ***White tea:*** This is high-quality specialty tea produced for the high-end niche market. It is produced in small quantities (<25 metric tons). A very young bud is used. A partial withering and rolling are followed by short oxidation, drying, sorting, grading, packaging and labeling. This tea is normally exported to Europe and the USA at the premium price.

E. ***Golden tea:*** The process is the same as black tea, but the timing of each step differs and produces golden color tea.

F. ***Pearl green tea:*** It is specialty tea made in a pearl shape by hand rolling. It is produced in small quantity (<10 metric tons). It is popular in China and now also exporting to Germany. But the production is limited.

2.1.4 Process

The following processes are involved to produce different types of tea

2.1.4.1 Plucking

Normally one terminal bud and two young leaves are plucked by hand and brought to the factory within the same day. Some special tea like golden middle, silver middle, white tea uses single bud only. Depending on the skill, one person can pluck up to 20 kg of leaves per day. Plucking is done at 7-day interval from March to October. Some growers also use plucking machines but due to sloppy land, it is difficult to meet the plucking standard and the chance of the broken leaf is higher.

2.1.4.2 Withering

It is the partial removal of moisture from the fresh leaves. The leaves are usually spread over the withering trough fitted with perforated trays under which forced air is circulated. Depending on the type of product, withering is done 10 to 14 hours. The moisture level drops up to 80 percent during withering. Some processors steam the fresh leaves using a steaming drum.

Steaming is done particularly for making green tea. This process breaks down the protein into free amino acids and increases the availability of caffeine which changes the taste of the tea.

2.1.4.3 Rolling

After withering, the leaves are rolled into wrinkled strips either by hand or by rolling machine. This process ruptures the sap and allows the essential oils and juices from the leaves to ooze out and enhances the taste.

2.1.4.4 Fermentation

It is an enzymatic oxidation process where rolled strips are spread over a clean floor of a climate-controlled room. The room should not be exposed to sunlight and humidity. It is done to make black tea. In this process, the rolled strips turn into dark/black color and the liquor color becomes black. It is important to develop desired color and taste. It determines the organoleptic qualities of tea by breaking down the chlorophyll and reducing the astringency. Green and white tea do not require fermentation.

2.1.4.5 Drying

It is the process of removal of all residual moisture so that the tea can be kept for a long time without deteriorating its quality. Various types of dryers are used to dry the tea. Care should be taken to make sure that the tea is not under or over dried. Generally, tea is dried approximately 20 to 25 minutes with hot air of 80-90 degree Celsius keeping the moisture level 5 percent.

2.1.4.6 Grading

The first grading is done using grading/sorting machine. The second grading is done manually by the bamboo sieve. Based on grading tea is categories as leaf grade, broken, fanning and dust and valued accordingly. The graded tea is then packed and labeled into 20 kg paper sac

for the wholesale market. For the retail market, the processors or retailers packed the leaf grade tea in small packet (50,100, 250 gram).

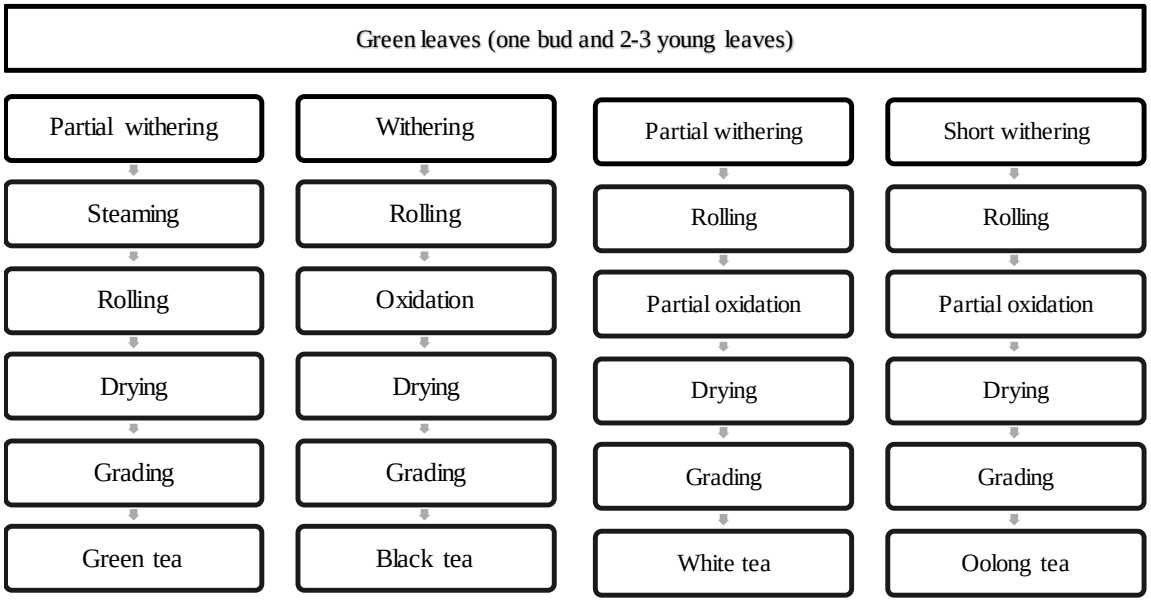


Figure 5: Tea Manufacturing Process Flow Chart

2.2 Porter's Five Forces Analysis

The porter's five forces tool, developed by Professor Michael Porter, is used to analyze tea industries competitive environment. It is considered as an important tool for assessing industry's attractiveness and level of competition. Each force is elaborated as follows.

2.2.1 Bargaining Power of the Suppliers: High

Green leaves producing farmers, farmers' cooperative, machinery equipment suppliers, organic certification companies and skilled manpower are the key suppliers/service providers for this industry. The green leaves production is limited and most of the processing firms are operating under capacity utilization. This is mainly because of the unavailability of quality green leaves at local level. The processors are competing with each other to get more green leaves from farmers. Most of the farmers sell their green leaves through cooperatives. The cooperative has high

bargaining power against processors. The switching cost is almost nothing for farmers. Thus, the farmers and cooperatives have more bargaining power and capture more value for their products.

Moreover, there is only one Chinese machine supplier which market share is about 70 percent. There are less than five Indian suppliers who provide a complete set of processing machines. Thus, the processors have limited choice. Therefore, Chinese processing machine suppliers have more bargaining power, but the Indians have moderate to low. The organic certifying agencies are not based in Nepal and their annual fees are normally non-negotiable. The switching cost is higher for the processors if they want to change the certifying agency because the certification process takes 3 years to complete organic certification. Hence, the processors have low bargaining power to reduce the organic certification cost. Moreover, there is limited skilled manpower and their wage demand is usually higher than the normal market price. Hence, tea industries highly depend on input suppliers and therefore the bargaining power of suppliers is higher in this industry.

2.2.2 Bargaining Power of the Buyers: High

Nepal tea has several competitive advantages over many other teas. However, there is less opportunity to compete in the global market. Some reasons behind it are lack of market infrastructures like auction market, blending and warehouses, limited buyers, and market promotional programs. The market is dominated by limited numbers of Indian buyers and few other domestic and international buyers. Thus, there is competition among processors to market their product and the buyers have many options available. The buyers can easily get the similar products from various processors within the same geographical location at competitive price. There is a low switching cost for buyers. Thus, buyers have more bargaining power which leads to lower factory gate price.

2.2.3 Threat of New Entrants: Low

There is high competition among existing firms for green leaves, skilled manpower and markets. The processing technology requires product specific processing techniques and skills. The processing units are operating under capacity utilization. These factors along with limited access to the global market are subject to increase the cost of production and risk to the new investor. It is difficult to establish brand loyalty because of India dependent market. The government has limited policies and services on the tea sector development. Thus, the threat of new entrants is low.

2.2.4 Threat of Product Substitute: Low

India, China, Sri Lanka and Kenya are the major competitors of Nepal tea. But the global market and price are in increasing trend and Nepal is producing a wide range of specialty tea and offering at lower price. At the same time, the demand is also in increasing trend (Appendix E). Nepal tea has wide range products and has distinguished flavor and aroma. The tea is produced at higher altitude than other countries. The tea bushes are not older than 30 years which add the value in quality. The tea is produced by small farmers manually and carefully. Looking at the marketing margin, the net marketing margin for the retailers was found above $95 which might be an attractive margin for the retailers. Similarly, Nepalese traders can compete with the global market price which was observed $17.37 per kg in 2018. Moreover, about 79 percent of the respondents who bought Nepalese tea from the USA and German based retailers rated Nepalese tea as an excellent tea (Table-9). It is difficult to change consumer's drinking habit and preferences which makes difficult for retailers to substitute Nepalese products with other products. Moreover, the switching cost for retailers to replace existing brands is high. Thus, all these competitive advantages lower the threat of product substitute with other country of origin products. On the

other hand, there are many substitute products available in the market such as coffee, cocoa, soft drinks and juice. Some of them may be cheaper than tea. Furthermore, the young generation may not be well accustomed to tea. However, increasing global population, increasing awareness about the health benefits of tea among consumers and growing market trend of tea have lowered the threat of substitute.

2.2.5 Internal Rivalry: High

There are over 120 tea processing firms within the periphery of 200 miles as of 2019. They are competing for buying green leaves and selling made tea. There is a price war for green leaves, skilled tea makers and made tea because of the shortage of green leaves, skilled manpower and limited access to the market. The market is determined by few buyers and the processors are competing to attract them. The switching cost is low for buyers. There is not much product differentiation among Nepalese processors. Thus, the rivalry among industries is high which again leads to reduce product prices.

2.3 Strategic Issues Analysis

Based on the key informant's interview and stakeholder's consultation conducted in 2016, the following issues were identified at different stage of the supply chain.

2.3.1 Farm Production Related Issues

Nepalese agriculture is characterized by subsistence and rainfall dependent farming. The majority of the farmers have less than two hectares of land. They use traditional production technologies and do not have modern production tools like drip irrigation, fertilization and pruning machines. Farmers have low investment capacity. The productivity was found to be less than one kg per bush per year whereas neighboring countries India and China have more than one kg per bush per year. Tea growers have limited access to resources such as quality production inputs,

technical services, financial services, irrigation and labor. There is no research on varietal development and productivity improvement in tea. Tea agronomist are not easily available in the market. March and April are the months for producing high quality first flush tea. Because of the shifting of rainfall patterns, the quality of first flush tea has been affected.

2.3.2 Processing Related Issues

Small scale production, shortage of technical manpower, inefficient processing facilities, low capacity utilization, frequent electricity shut off and low investment capacity are the major problems facing my Nepalese tea processors. The average annual production per processing firm was found to be 38.9 metric tons. The average processing capacity was found below 35 percent. The consequences of these issues have increased the production cost of tea processors. Furthermore, the annual organic certification cost ranges from $6000 to $12000 per year depending on the number of farm/farmers covered and certifying agent which is expensive particularly for the small tea processors.

2.3.3 Market Related Issues

Nepalese tea market is highly volatile because of India dependent market. Few Indian buyers hold up to 90 percent of the market. Nepalese exporters have limited access to other international market because of several barriers such as sanitary and phytosanitary barriers, lack of communication and marketing skills, small quantity supply, lack of proper market infrastructure like auction center, warehouse, blending facilities, naval port, limited market chain linkage and market promotional program, unorganized supply chain system, internal competition among processors and limited policy support for national brand development. The price is based on negotiation.

Chapter 3: Literature Review

The United States Agency for International Development (USAID) funded Nepal Economic, Agriculture, and Trade Activity (NEAT) conducted a value chain analysis of the orthodox tea sub-sector in Nepal in 2011. The study mentioned that the Nepalese orthodox tea is popular for its aroma, appearance, bright liquor, and slightly fruity flavor. They further investigated that 90 percent of orthodox tea is exported to India. The study found that the global demand of Nepalese orthodox tea is high, but the production is still low. They also calculated the cost of production of green tea leaf which was approximately 19.55 Nepalese rupees per kilogram. The cost of organic tea production was found 39.43 to 52.20 rupees per kg. The average price of the organic and conventional leaf was found 40 to 55 and 20 to 26 Nepalese rupees per kg respectively. The estimated average manufacturing cost was 140 to 200 rupees for conventional tea and 260 to 300 rupees per kg for organic in 2011.

Tiwari et al (2017) studied the economics of orthodox tea production in Nepal. This study has only focused on the cost and benefit analysis of tea leaves production. The study was conducted at Fikkal and Kanyam of Ilam district. The study found that the gross margin per hectares was positively correlated with increased farm size in both the study areas. Furthermore, the cost benefit ratio was greater than one in both the study areas. The shortage of quality inputs, insufficient technical knowledge, quick perishability of green leaves, price variation, weak coordination among value chain actors were the major identified problems of this study.

Adhikari et al. (2017) studied the value chain analysis of Nepalese orthodox tea in 2014. Data were collected from 441 tea growers in Ilam district. The study found a higher marketing margin in certified tea leaf (NRs. 24.21/kg) compared with non-certified (NRs. 14.21/kg). However, the study revealed that certified tea growers had lower income than non-certified

because of the economies of scale of organic production and low premium price received by organic growers.

Bijman et al., (2006) published a book by collecting 23 research papers about management and organization in international agri-food chains and networks. The papers in this book have covered theoretical and practical insights about various management issue in agri-food chains and networks. The authors mentioned that the producer organizations are established to benefit from bargaining power, risk sharing and/or economies of scale. They further stated that the producer organizations can improve efficiency and efficacy of agri-food supply chain by exploiting economies of scale and scope as well as by reducing transaction cost. Similarly, Martinez (2002) studied the vertical coordination of marketing systems using the case of US poultry, egg, and pork industries. He found that contracts and vertical coordination provided an efficient means of organizing markets by reducing transaction costs in these industries.

In 1979, Michael E. Porter, Professor of Harvard Business School published porter's five forces framework in the Harvard Business Review. The five forces are; i. Bargaining power of suppliers, ii. Bargaining power of buyers, iii. Threat of new entrants, iv. Threat of substitute products or services and v. Rivalry among existing competitors. Porter (2008) believes that this framework is useful tool to improve competitiveness and profitability of an industry because it helps to understand the structure and position of this industry that is more profitable and less vulnerable to attack. This framework is now extensively used by many industries to understand the competition and profitability that exist within the industry. Espallardo and Ballester (2009) used this framework to study the effectiveness of innovation in improving a firm's performance at different competitive situations in Spain. The researchers found that innovation is the major driving force that shapes the small firms. Mathooko and Ogutu (2015) studied Porter's five

competitive forces framework and other factors that influence the choice of response strategies adopted by public universities in Kenya. Their research assessed that the pressure from stakeholders, changes in government policies and regulations, reforms in higher education, unethical response strategies by some universities and university location are the major forces influence the choice of response strategies. Pringle and Huisman (2011) studied the understanding universities in Ontario, Canada using porter's five forces framework. Their research explored that the impact of technology and globalization are the major forces that make the Ontarian higher education system competitive.

Khoi et al. (2015) analyzed the value chain of the Vietnamese tea industry focusing on the role and benefit sharing among value chain actors. The study found that processors incur 45 percent of the total cost but gain only 11.9 percent profit. On contrary, the traders bear little cost but gain a relatively high return. Among traders, wholesalers bear 11 percent of the total cost and gain 31.4 percent profit. This study concluded that there is weak coordination among the participants in the tea manufacturing process and margin is shared unequally in the chain. The study suggests that the vertical integration approach can help processors to achieve higher returns.

The financial analysis examines the firm's liquidity, solvency, efficiency, profitability, operating efficiency and financial stability in both short-term and long-term (Bhunia et al., 2011). The profitability and stability of a business firm can be achieved by efficient use of resources. Some studies on the orthodox tea value chain have conducted limited financial analysis, however detailed financial analysis of the Nepalese orthodox tea has not been published yet.

Noormmemon et al. (2015) investigated the cost of production and return per acre of mango production in Pakistan. A sample of 60 mango farmers was taken from various villages in taluka Tando Adam district Sanghar Sindh Pakistan. Using descriptive statistics, the study concluded that

the mango production is economically profitable with an average net profit of Pakistani rupees 87,488 per acre.

Aduba et al. (2013) examined the cost and return analysis and efficiency of resource use efficiency of maize production at Kogi state, Nigeria. A total of 500 households engaged in maize production were investigated. Primary data were collected from 500 maize producing households and were analyzed using descriptive statistics analysis, budgetary analysis, multiple regression analysis and resource use efficiency models. The regression analysis showed that the variable inputs such as the quantity of seeds, fertilizers, agro-chemicals, farm size and year of experience significantly affect maize production in the study area. The empirical results revealed that these variable inputs are not efficiently used. The study concluded that maize production is viable and profitable under the efficient utilization of resources.

Oluyole et al. (2013) assessed the input use efficiency of cocoa farmers in the Ondo State of Nigeria. This study has conducted cost and return analysis, farm production function estimation using ordinary least square and marginal product value (MPV) and marginal factor cost (MFC) using regression coefficient and unit price of each input used in cocoa production. The study concluded that cocoa farmers were not utilizing production inputs efficiently.

Emam (2011) studied the market efficiency of tomato in Khartoum State, Sudan. The researcher estimated market margin by deducting selling price with the cost price and net marketing margin by deducting marketing margin with marketing cost. Furthermore, the researcher calculated market efficiency by dividing consumer price by marketing cost and then subtracted the result with one. The study found that the tomato wholesaler received a higher marketing margin than retailers, but the retailers have higher marketing efficiency.

Dastagiri (2017) analyzed the exports and price growth rates, elasticity, instability and major global markets for Indian tea and coffee. The study was conducted using 24 years of agricultural time-series data from 1990–1991 to 2012–2013. Based on an analysis of individual country elasticity and growth rates, the study concluded that India has a comparative advantage to export to the Middle East, Europe, the United States, and Australia.

Similarly, several researchers have used the Cobb-Douglas production function model to estimate production and production cost efficiency. Wei (2007) used Cobb-Douglas production function to analyze the impact of energy efficiency gain on energy production and use. In this study, energy production and energy use are considered as dependent variables and capital, labor and energy price as independent variables. The researcher implied that the values of energy production and energy use efficiency depend on the values of inputs (independent variables).

Abozaid and Mansour (2016) used the Cobb Douglas production function to estimate the efficiency of resource use in millet production among smallholder farmers in the North Sinai region of Egypt. The researchers found that if other factors remain constant, a unit increases in labor and capital utilization by the producers would increase millet yields. Both labor and capital inputs are positive determinant of smallholder millet production farmers.

International Trade Center (ITC) published a national sector export strategy for Nepalese tea for the period of 2017 to 2022. Their report also mentioned that the global tea market is growing in volume and quality which provides new opportunities for small producing countries. The study investigated that world tea production was increased by a compound annual growth rate of 3.85 percent during the period from 2011 to 2015 and reached 5.3 million tons in 2015. At the same time, global import was increased at a CAGR of approximately 6.3 percent over the past 15 years. The study depicted that China, India, Kenya, and Sri Lanka were the world's top tea

producing and exporting countries where China was the largest tea producing country accounting for more than 43 percent of the world total production. The study also investigated that Nepal exports tea to more than 35 countries, but India represents around 88 percent of total exports. During the study period, the other importing countries were Germany, the Czech Republic, the Russian Federation, China, France, the United States, Japan, Canada, and Ukraine.

Similarly, FAO (2018) reported that world tea production was increased by 4.4 percent annually over the last decade and reached 5.73 million tons in 2016. The study also found that China accounted 42.6 percent of world tea production followed by Kenya and Sri Lanka. Likewise, the global tea consumption was increased annually by 4.5 percent and trade volume by 2.2 percent. Kenya was found to be the largest exporter in 2018 followed by India, Sri Lanka, Argentina, Vietnam, Uganda, Tanzania, Rwanda, Malawi, and China. The growth in per capita income, increased awareness of the health benefits of tea consumption and product diversification were found major factors to increase consumption.

Tea contains polyphenols which release antioxidants (Dhiman et al. 2013). Tea also has caffeine and therefore it has a stimulant effect. Gardner et al. (2006), Bahorun et al. (2012) and Ferruzzi, (2010) mentioned that regular consumption of tea reduces the risk of several chronic and degenerative diseases including cardiovascular disorders, diabetes, obesity, and neurodegenerative disorder. Similarly, Larsson et al. (2013), Arab et al. (2009), Hakim et al. (2003), Geleijnse et al. (2002) and Peters et al. (2001) revealed that the people who regularly consume three or more cups of black tea per day have a reduced risk of heart disease and stroke. Furthermore, Tian et al. (2016) found that the consumption of green tea reduced the risk of CHD incidence and improved multiple CHD-related risk markers including total cholesterol, HDL-cholesterol, triglycerides, mean platelet volume, and uric acid.

Chapter 4: Data Description

The study is based on data from a combination of primary data collection, participant observation, and secondary sources. The quantitative and qualitative data were collected from primary and secondary sources. The quantitative data collection process involved survey and online data sourcing. Similarly, the qualitative data collection process involved focus group discussions, key informant interviews, online information collections, and literature reviews. The secondary sources of information and data were obtained from the library database of Kansas State University, the official website of NTCDB, FAOSTAT, ITC Trade Map, STATISTA and various trade and academic publications.

4.1 Quantitative Data

The financial data used in this study is the financial analysis of individual tea processing firm conducted in 2017 which covered one business cycle of 65 individual orthodox tea processors. It includes input-output data such as total investment, variable cost, fixed cost, training cost, depreciation, and revenue. The financial analysis format has 10 sheets (Appendix C): capital investment, fixed cost, variable cost, depreciation, revenue, profit and loss, cash flow, balance sheet, breakeven point and ratio analysis. The format is in the excel sheets and customized with an auto calculation formula. The collected financial information was verified with the market price of some cost items. The financial information of 2018 such as production cost, total production and market price were collected in 2019 from each firm and updates were made to their financial analysis sheet. This updated financial analysis of each firm is used in this study for the financial analysis of the Nepal tea industry.

The description of financial variables that are used in this study is as follows.

4.1.1 Capital Investment

The capital investment is divided into the following three subheadings;

4.1.1.1 Physical Infrastructure

It consists of the cost of factory building, office building, withering trough, collection center and some other small infrastructures like waste pit. Based on the processing capacity, factories are categorized as small (below 50 metric tons tea/year), medium (50 to 100 metric tons per year) and large (above 100 tons per year). The construction cost of the building depends on available budget, size and type of construction, quantity and quality of material cost, labor cost, location, condition of construction side, construction duration, and type of contractor. The infrastructure cost given in the format is their approximate cost.

4.1.1.2 Machinery Equipment Cost

The machinery equipment procurement decision depends on the availability of raw materials, types of tea production, available budget and plan. The basic tea processing machines are dryers, rollers, sorting machines, enzymer and withering fan. Some other equipment like generator, transformer and green leaf collecting van are also essential for every firm. Nepalese tea processors have either an Indian or Chinese processing machine set. Most of the small processors have Chinese machines whereas medium and large processors have in general, Indian machines. Some medium or big factories have both Indian and Chinese. Indian processing machines are suitable for mass production, particularly for black tea. Chinese processing machines are more suitable for small scale production and particularly for green and specialty tea. The average costs of small, medium and large Chinese processing machines are about $25,000, $35,000 and $45,000 respectively whereas the Indian is 30-50% more expensive than the Chinese. The cost of

machinery equipment calculated in this study is based on the actual cost that the processors paid to the suppliers in 2017/18.

4.1.1.3 Software (Training)

Software activities include their annual fixed activities like technical trainings, organic certification cost. Technical trainings are normally organized for farmers and tea makers. The organic certification cost includes organic production technology training, internal control system, farm record keeping, organic inspection and certification cost. There is no accredited organic certified agency in Nepal. So, the average annual organic certification cost in Nepal ranges from $6,000 to $12,000. The cost varies depending on the size of production and certifying agency.

4.1.2 Variable Cost

The variable costs are divided into following four subheadings;

4.1.2.1 Raw Material Cost

Raw material includes green tea leaves and packaging material. The price of the green leaves varies depending on various factors such as types of leaf, season, location, production method, production volume and productivity, labor cost, number of buyers, transportation cost and buying sources. The price of a single bud is above $10 per kg. Similarly, the average price for one bud and a succulent leaf is $3.5. The average price of the organic green leaf having one bud and two succulent leaves is $0.60 and for non-organic is $0.50 per kg. The leaves having more than three leaves have less than $0.40 per kg. The price is normally higher in Spring and lower in Autumn. Likewise, buying from the middleman (broker) and from cooperatives is comparatively higher than buying directly from the farmers. In this analysis, the price of green leaves is the annual average price of one bud and two leaves including transportation cost that the processors paid in

2018. The packaging material in this analysis refers to the paper sack for 20 to 25 kg tea packaging and the cost per sack ranges from $0.30 to 0.50.

4.1.2.2 Seasonal Labor Cost

Seasonal labor is required for nine months during processing time. Labor is normally hired monthly with an average monthly salary of $150.

4.1.2.3 Energy Cost

Energy consists of fuel, firewood and electricity cost. Generator and leaf transporting van require fuel (Diesel), dryer requires firewood, withering trough, roller, enzyme, sorting machine require electricity. Normally, the processing machine operates nine months per year and average electricity consumption is one kWh per kg of tea. The electricity consumption in the remaining three months is about $2 per month. The energy cost is calculated accordingly.

4.1.2.4 Distribution Cost

It is the transportation cost from factory to the domestic buyer's location. It is either Kathmandu or Siliguri India and average distribution cost may vary from $0.02 to $0.10 per kg.

4.1.3 Fixed Cost

The fixed costs include skilled labor cost, maintenance of fixed assets, audit cost, communication and stationary cost, market promotion cost, insurance and Equated Monthly Installment (EMI) for the loan. Maintenance cost is estimated at 0.2 to 0.5 percent of the cost of total fixed assets. Similarly, insurance cost is estimated at 0.5% of the total fixed assets.

4.1.4 Depreciation Cost

Depreciation is the reduction of the value of processing building and machines. It is calculated by dividing the total cost of fixed assets by the number of years of useful life. In this

analysis, the useful life of buildings and processing machine is considered 20 and 15 years respectively.

4.1.5 Marketing Margin

Market margin is calculated by using the estimated production cost and selling price of Nepalese farmers, processors, and US-based retailers. The production cost of farmers was taken from the study of Adhikari et al. (2017) and converted into US dollars considering that 1 US dollar is equivalent to 100 Nepalese rupees at that study period. The cost and selling price of the processor were collected from the 65 tea processing firms. The cost of retailers was collected from Discover Nepal Tea. The selling price of retailers is the retail price of normal black and green tea which was collected from 6 US-based Nepalese tea retailers through their website on September 23, 2019. The global tea production and trade related data were collected from the FAOSTAT and ITC Trade Map database.

4.2 Qualitative Data

Several stakeholders' consultation workshops and focus group discussions were organized by UNNATI program and International Trade Center in major tea producing areas in 2015, 2016 and 2017. The information related to tea production, processing and marketing were collected during these events. Similarly, some relevant information is also extracted from literature reviews. Key informants' interviews were also conducted to collect some missing information and verification of financial information.

Chapter 5: Methodology

The industry analysis is assessed based on the field study, key informant interview, and participant observation. The financial analysis is carried out by collecting financial information of 65 orthodox tea processing firms located in Ilam, Panchthar, Taplejung, Dhankuta, Terhathum, Sankhuwasabha, and Bhojpur district. The financial performance is analyzed by using various accounting ratios. The Cobb-Douglas production function is used to estimate the relationship between the amount of tea produced and the amount of various input used in the production, and resource use efficiency. The cost function is used to estimate the marginal cost. A regression model is used to estimate Cobb-Douglas production function, cost function, and resource use efficiency. The marketing margin is calculated based on previous studies, field survey and on the estimated purchasing, value addition and marketing cost of retailers collected from Discover Nepal Tea, a US-based marketing company of STAN.

The market analysis is assessed by sourcing the data from FAOSTAT, ITC Trade Map, NTCDB, TEPC, and STATISTA. The retail market price is collected from official website of US based Nepalese tea retailers. The market analysis covers only black and green tea and does not cover other teas like herbal tea, iced tea, ready to drink (RTD) tea. The production data were obtained from NTCDB and FAOSTAT database. The export and import data were taken from FAOSTAT and ITC Trade Map. The market growth, consumption and price trend related data were obtained from STATISTA, a popular German online portal for statistics. The price of Nepalese tea and consumer ratings were collected from the official website of Nepalese tea retailers who are selling Nepalese tea in the global market through eCommerce.

5.1 The Structure of the Analysis

The three major analyses are conducted to achieve the objectives of this study. The industry analysis covers the supply chain analysis, porter's five forces analysis and strategic issue analysis. The analyses were conducted based on field survey, stakeholders' consultation workshops, key informants' interview and previous studies. The financial analysis covers cost, return and profitability analysis, production function analysis, cost function analysis, factor productivity analysis, resource use efficiency analysis, marketing margin analysis. Various accounting formulas and linear regression model were used for financial analysis. Market analysis covers domestic and global market overviews including market growth, export-import trend, major competitors, target market, price, consumption and market segments. The statistical data obtained from National Tea and Coffee Development Board, Nepal, Trade and Export Promotion Center Nepal, ITC Trade Map, FAOSTAT and STATISTA were used for market analysis.

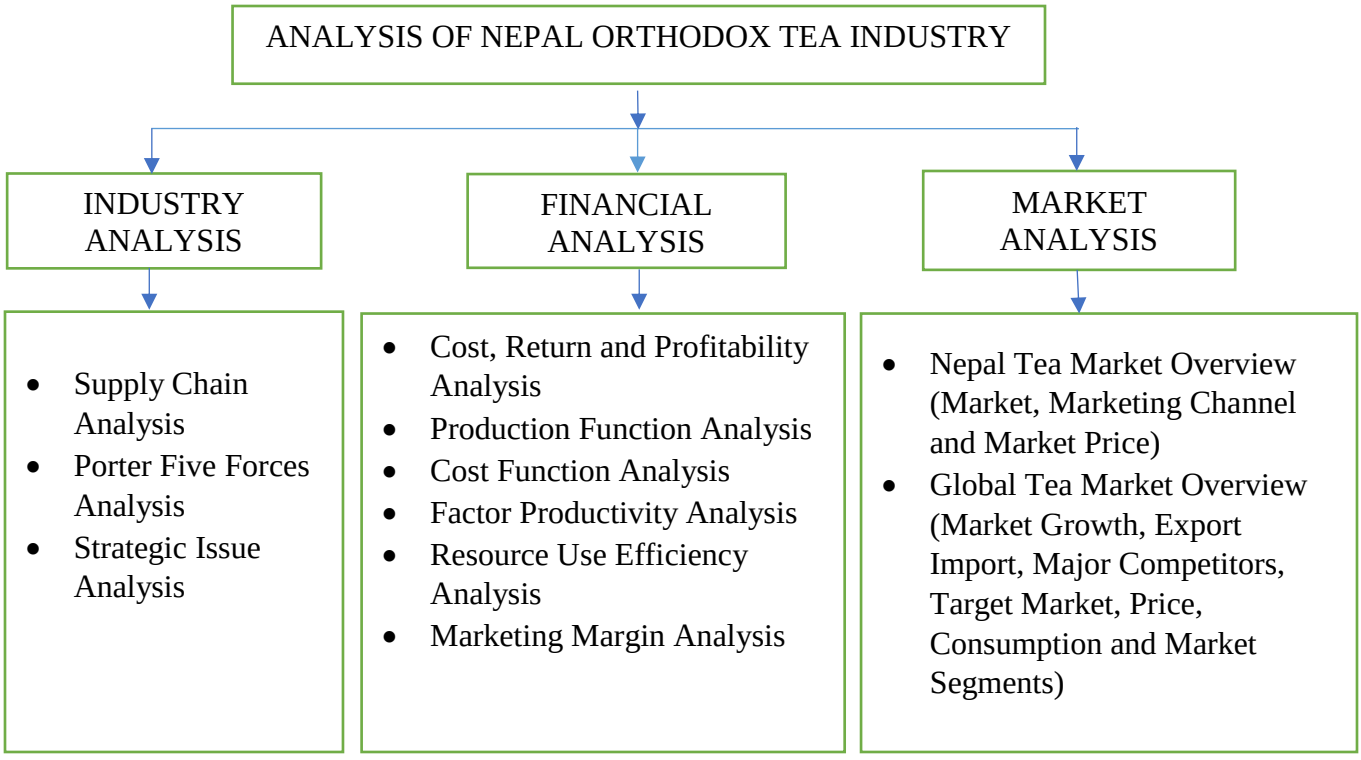


Figure 6: The Structure of the Analysis

5.2 The Theoretical Framework

Cost minimization and profit maximization are the two economic principles of the production firm. A production function is a common analytical tool in production economics which helps to estimate production potential of a firm. It also helps to use production resources efficiently and rationally. Theoretically, the production is the function of the capital, labor, raw materials and other factors affecting production which can be defined as:

$$Y = f(L, K, M, \ldots).$$

Where production (Y) is a function of labor used (L), capital invested (K) and raw materials used (M), and other variables affecting the production process. In this study, the production function is used to estimate the maximum amount of tea that can be produced by rational use of labor, capital and green leaves.

Similarly, the cost function is used to estimate the marginal cost of production which helps to minimize cost and maximize production efficiency. Theoretically, the total cost of production is the function of total output produced which can be defined as:

$$TC = f(Q).$$

5.3 The Empirical Framework

The financial analysis is the key aspect of this study. The following variables, methods and models are used to analyze the financial performances of the Nepalese orthodox tea industry.

5.3.1 Total Cost

The total cost of orthodox tea is the sum of total fixed cost, total variable cost incurred by a processing firm in producing a certain quantity of made tea.

$$\text{Total Cost (TCi)} = TVCi + TFCi + TrCi + DCi$$

Where TCi = Total cost of firm i

TVCi=Total variable cost of firm i

TFCi=Total fixed cost of firm i

TrCi = Training cost of firm i that also include organic certification cost for organic production

DCi=Depreciation cost of firm i

5.3.2 Revenue

Revenue is the income generated from the sale of processed tea. It is calculated by multiplying total production with per kg price.

Total Revenue (TRi)= $\sum_{i=1}^{n} P_i \times Y_i$

Where, TRi = Revenue obtained from the sale of made tea in firm i

P_i = per kg price of tea in firm i

Y_i = Amount of tea produced in firm i

5.3.3 Net Profit (Loss)

Net profit (loss) from orthodox tea production is calculated by deducting total processing costs and income tax from the revenue. The total cost, revenue and profit (loss) of 65 processing firms is calculated using the following formula;

The net profit (loss) of orthodox tea production (π) = TRi – (TCi + Income Tax)

5.3.4 Cash Flow

Net cash flow is calculated by deducting total cash outflow (Capital investment + fixed cost + variable cost + income tax) with total cash inflow (Revenue). It measures how well the company manages the cash to pay its debt and operating expenses.

5.3.5 Balance Sheet

Balance sheet is a snapshot of the financial position of a tea processing firm that has three sub-components: i) Total assets, which includes cash and net fixed assets after deducting depreciation; ii) Total liabilities, which are the company's debts; and iii) Total equity and reserve, which is owner's equity and retained earnings.

5.3.6 Gross Margin

Gross margin is the difference between total revenue and variable cost.

$$\text{Gross margin} = \text{Revenue} - \text{Total variable cost}$$

5.3.7 Benefit-Cost Ratio

$$\text{B/C Ratio} = \frac{\text{TRi}}{\text{TCi} + \text{Income Tax}}$$

5.3.8 Return on Investment

$$\text{ROI} = \frac{\text{Net Profit}}{\text{Total investment}} \text{x} 100$$

5.3.9 Break Even Point (BEP)

It is the point where the revenue equals the total production cost. It is calculated by dividing the fixed cost by the contribution margin.

$$\text{BEP} = \frac{\text{TFCi}}{\text{TRi} - \text{TVCi}} \text{x} 100$$

5.3.10 Production Function Analysis

To find the relationship between production inputs such as capital, labor and raw materials and the total production, a production function analysis is done using regression model.

$$\text{LnQ} = \beta_0 + \beta_1 \text{LnK} + \beta_2 \text{LnL} + \beta_3 \text{LnM} + e_i$$

Where

Q =Total quantity of orthodox tea produced (Output) in 2018 expressed in Nepalese rupees;

K= total capital investment as of 2018 expressed in Nepalese rupees;

L= total labor input in 2018 expressed in Nepalese rupees;

M=Total raw materials used in 2018 expressed in Nepalese rupees;

β_0, β_1, β_2 and β_3 are the coefficients of capital, labor and raw materials and

e_i = Error term

5.3.11 Total Factor Productivity

Total-factor productivity (TFP) is the portion of output not explained by the amount of inputs used in production. TFP is calculated by dividing total production by the weighted average of labor and capital used in the production. The standard weighted average is 0.7 for labor and 0.3 for capital.

In the equation below, A is the factor of productivity which represents the increase in total production that is not explained by the increase in labor and capital.

$$Q = A(K^{\alpha} L^{\beta})$$

5.3.12 Cost Function Analysis

A linear regression analysis is used to find the relationship between total cost and total production.

$$\mathrm{TC} = \beta_0 + \beta_1 \mathrm{Q} + e_i$$

Where TC=Total processing cost in 2018 expressed in Nepalese rupees

Q=Total tea production in 2018 expressed in kg

5.3.13 Resource Use Efficiency

The efficiency of resource use in the production of orthodox tea is determined by the ratio of Marginal Value Product (MVP) to Marginal Factor Cost (MFC) of variable inputs based on the estimated regression coefficients. Following Karthik et.al. (2015), the efficiency of resource use is calculated using following formula:

r= MVP/MFC

Where r= Efficiency ratio

MVP= Marginal value product of a variable input.

MFC= Marginal factor cost (Price per unit input)

The value of MVP is estimated using regression coefficient of each input and the price of output.

MVP= MPP x_i × Py (Unit price of output)

But, MPPx_i= $dy/dx_i = b_i (\bar{Y} / \bar{X}_i)$

Where; bi= Estimated regression coefficient of input X_i

$\bar{Y}$= Geometric mean value of output

$\bar{X}_i$ = Geometric mean value of input being considered

The prevailing market price of input will be used as the Marginal Factor Cost (MFC).

MFC= Px_i Where, Px_i= Unit price of input x_i.

The decision rule for the efficiency analysis is as;

r=1; Resource is being efficiently utilized

r>1; Resource is being underutilized

r<1; Resource is being overutilized

Again, the relative percentage change in MVP of each resource required to obtain optimal resource allocation i.e. r=1 or MVP= MFC will be estimated using the following equation below;

$$D = (1\text{-}MFC/MVP) \times 100$$

Where D= absolute value of percentage change in MVP of each resource and r= efficiency ratio.

5.3.14 Marketing Margin

It is the difference between the factory gate price and the price paid by the consumers. The analysis follows the paper of Emam (2011) who estimated the marketing efficiency of tomato in Sudan.

Marketing margin=Average retailers' prices– Average factory gate price

Net marketing margin=Marketing Margin-Marketing cost

The consumers price is collected from the official website of US-based Nepalese tea retailers. The marketing cost is estimated based on the cost and retail price of the normal black and green tea in the US retail market. This analysis has not included other specialty tea like white tea, silver needle, golden tips, herbal tea, RTD tea. In addition to that, the cost and margin of the retailer is calculated on the assumption that the company sells at least 10,000 kg tea per year. The retailers' cost includes freight cost, custom clearance cost, local transportation cost, warehousing cost, electricity cost, packaging and labeling cost, market promotional cost, shipping cost, Bank EMI and operational and management cost. The average factory gate price in Nepal is estimated at $6.06 per kg which is the average price of 65 processing firms. But the average retailer's buying price is considered $25 per kg in this analysis. It is because the US buyers buy only high-quality selective products and this price is likely the average buying price of all US buyers.

5.3.15 Capacity Utilization

It is the ratio between total production of processed tea and the capacity of the processing firm.

$$\text{Capacity Utilization} = \frac{\text{Total production of processed tea}}{\text{Capacity of the processing firm}}$$

Chapter 6: Results and Discussion

6.1 Financial Analysis

6.1.1 Cost, Return and Profitability Analyses

The tea processing cost depends on the cost of green leaf (organic and non-organic), type and grade of leaf, types of processed tea, production volume, factory location, availability of electricity and labor cost. There is variation in processing cost and the market price of the made tea across factories of similar products. Similarly, price of processed tea depends on production cost, quantity produced, quality of the product, demand and supply situation, destined market, types of buyers, competitors' price, previous year price, type of tea, marketing channel, logistic cost, bargaining power of the buyer and seller, buyer's perception, inflation rate and trade policy including sanitary and phytosanitary regulation. The summary of the results presented in table 1 shows the average financial performance of 65 tea processing factories.

Table 1: Summary Statistics of Nepal Orthodox Tea

Parameters	Mean	St. Deviation	Minimum	Maximum
Investment	126,469.39	80,704.96	46,377.70	424,731.84
Total production in kg	38,981.01	43,661.19	5,541.63	231,000.00
Production cost per kg	5.58	2.12	3.04	12.94
Factory gate price per kg	6.06	2.14	3.73	13.57
Average variable cost per kg	3.51	1.08	2.29	8.57
Average fixed cost per kg	1.52	1.06	0.27	7.08
BC ratio	1.08	0.06	1.01	1.23
Return on investment (%)	13.34	16.58	0.65	79.98
Net margin per kg	1.03	0.49	0.40	2.44
Capacity utilization	0.33	0.22	0.06	0.96

Note: The exchange rate provided by Nepal Rastra Bank was USD 1.00 to NRs 113.74 on September 19, 2019.

The results show that the total investment required to set up a tea processing unit ranges from $46,378 to $42,4732 depending on the size and capacity of the processing unit. The average

production cost of Nepalese orthodox tea (Black and Green) was found to be $5.58, and the factory gate price was $6.06 per kg. The variable cost, fixed cost, training cost and depreciation cost were considered to calculate total production cost. The average variable cost and fixed cost were $3.51 and 1.52 per kg respectively but it varied mainly on the volume of production and types of tea produced. The margin varied between factories who are producing the similar products. The average net margin was $1.03 per kg. Furthermore, all the firms have benefit-cost ratios greater than one which indicates that all the firms are delivering positive net present value. Similarly, the average return on investment was 13.34 percent which shows the positive return of the investment. The average capacity utilization of processing machines was found to be 33 percent only. In this situation, the processing firms can minimize their processing costs by increasing capacity utilization.

6.1.2 Analysis of Factors Affecting Orthodox Tea Production

Table 2 below represents the variables and test values of the Cobb-Douglas production function. This analysis shows the relationship between output of the made tea production and the amount of inputs used. The revenue generated from made tea production is considered as a dependent variable and the costs of capital, labor and green leaves are considered as independent variables. All the units are in Nepalese rupees. The value of the coefficient of determination (R square) indicated that 97 percent of the variation of output is explained by this regression model. The output elasticities (production coefficient) of capital, labor, and raw material are positive indicating that an increase in the investment in each input holding other factors of production constant will lead to an increase in the revenue.

Table 2: Production Function Analysis

Variable	Parameter	Coefficient	Standard error	t-value	Pr(>|t|)
Revenue (NRs)					
Constant	β_0	0.46114	0.50129	0.92	0.3612
Capital (NRs)	β_1	0.20502	0.03338	6.142	<0.01 ***
Labor cost (NRs)	β_2	0.1283	0.05682	2.258	0.02 *
Raw material (NRs)	β_3	0.68919	0.03254	21.178	< 0.01 ***

Level of significance ***= <1%, and *=5%.

Adjusted R-squared: 0.9785

p-value: < 0.05

No. of observation: 65

The analysis revealed that a one percent increase in the investment in capital, labor and raw material will increase the revenue by 0.20 percent, 0.12 percent and 0.68 percent respectively. The result shows that raw material (green leaves) is the main factor affecting production. Furthermore, the total factor of productivity is only 1.5 which means 1.5 percent variation in the revenue is explained by other factors such as technology or market. The sum of the production coefficients is greater than one which exhibits increasing returns to scale. It indicates that if the three factors of production increased by one unit, the revenue will be increased by more than one unit. Thus, this result suggests that if other factors of production remain stable, the firms can invest more in production inputs so that they can get maximum output and profit. The result also suggests that firms can maximize their profit by increasing labor efficiencies. Since most of the processing firms

are operating under capacity utilization and there is increasing returns to scale, this analysis suggests processors could expand their production.

6.1.3 Cost Function Analysis

The cost function was estimated by taking the total cost of processing as dependent variable and total production in kg as an independent variable to study the relationship between the cost and production.

Table 3: Cost Function Analysis

Variable	Parameter	Coefficient	Standard error	t-value	Pr (>|t|)
Total cost (NRs)					
Constant	β_0	6094000	1130000	5.391	<0.01 ***
Production in kg	β_1	368.4	19.39	18.995	< 0.01 ***

Level of significance ***= <1%

Adjusted R-squared: 0.849

p-value: < 0.01

No. of observation: 65

Note: One US dollar is equivalent to 113.74 Nepalese rupees

The regression analysis predicted that the cost to produce one additional kilogram of tea is $3.24 whereas the production cost is $6.06 per kg on average. It denotes that if the firm increased their production, the production cost will be minimized significantly. This analysis suggests that if the other factors remain constant, the processors need to produce more tea so that they can minimize production cost and maximize profit.

6.1.4 Factor Productivity Analysis

The factor of productivity of labor and capital is calculated at processing level only.

Table 4: Total Factor of Productivity of Orthodox Tea Production in Nepal

Factors	Value (US $)
Average labor cost	25314.58
Average capital cost	126469.39
Total cost	151783.97
Factor labor	0.7
Factor capital	0.30
Weighted average of labor and capital	55661.02
Revenue	204320.05
Factor productivity of labor	11.53
Factor productivity of capital	5.38
Total Factor Productivity	3.67

Note: One US dollar is equivalent to 113.74 Nepalese rupees

The factor productivity of labor and capital is calculated at 11.53 and 5.38. It denotes that, on average, and all the other factors remain constant, one dollar increased in the labor and capital will generate $11.53 and $5.38 respectively. Similarly, the total factor productivity is found to be 3.67 which is the growth of real output not explained by the increase in these two inputs.

6.1.5 Resource Use Efficiency Analysis

The table 5 illustrates that the efficiency ratios (r) of capital and labor are below one which means these resources are being underutilized by the processing firms whereas raw material (green leaves) are overutilized. This result informs that there is shortage of green leaves whereas capita and labor are not utilized properly.

Table 5: Resource Use Efficiency of Capital, Labor and Raw Materials

Variables	Coefficients	Geometric mean	MVP	MFC	r=MVP/MFC
Capital	0.20	12,346,036.97	0.28	1	0.28
Labor	0.13	2,519,169.21	0.86	1	0.86
Raw material	0.69	7,911,394.70	1.47	1	1.47

6.1.6 Marketing Margin Analysis

The cost and margin at production level depend on various factors such as types of input used, production volume, geographical location, availability of resources. The cost and margin at processing level depends on the economies of scale, type of product, geographical location and availability of resources. Similarly, the cost and margin at trading (retailers) level depends on the volume of export, supply and demand situation, mode of transportation, packaging materials, volume of supply, types and size of market, types of product, consumer preference, marketing system, market promotional activities etc.

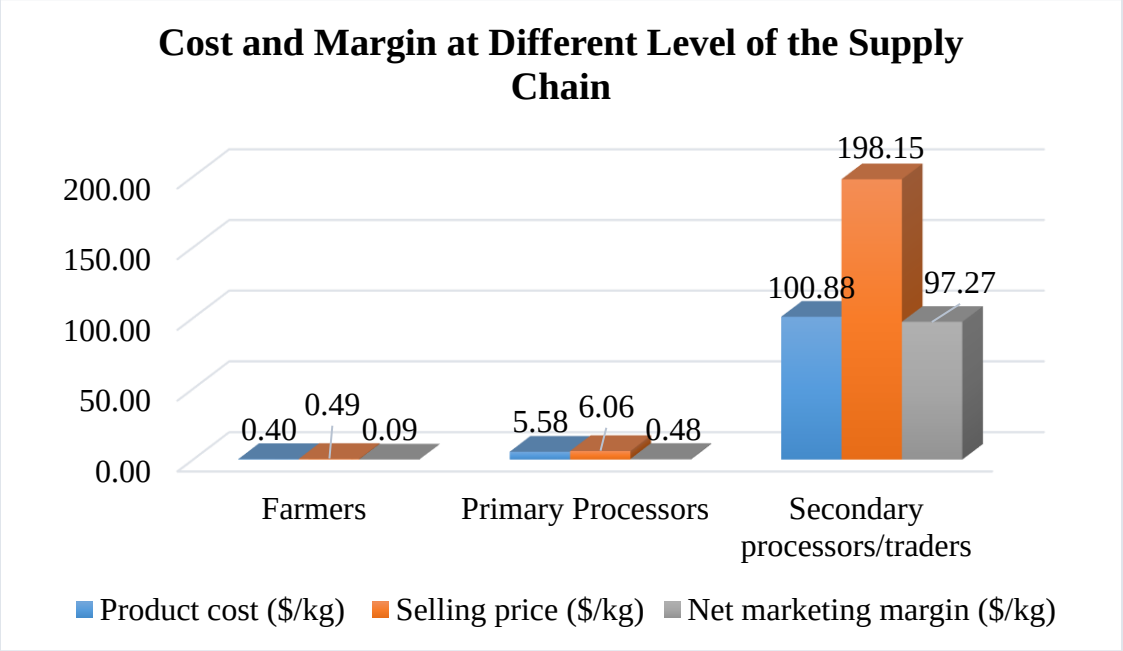


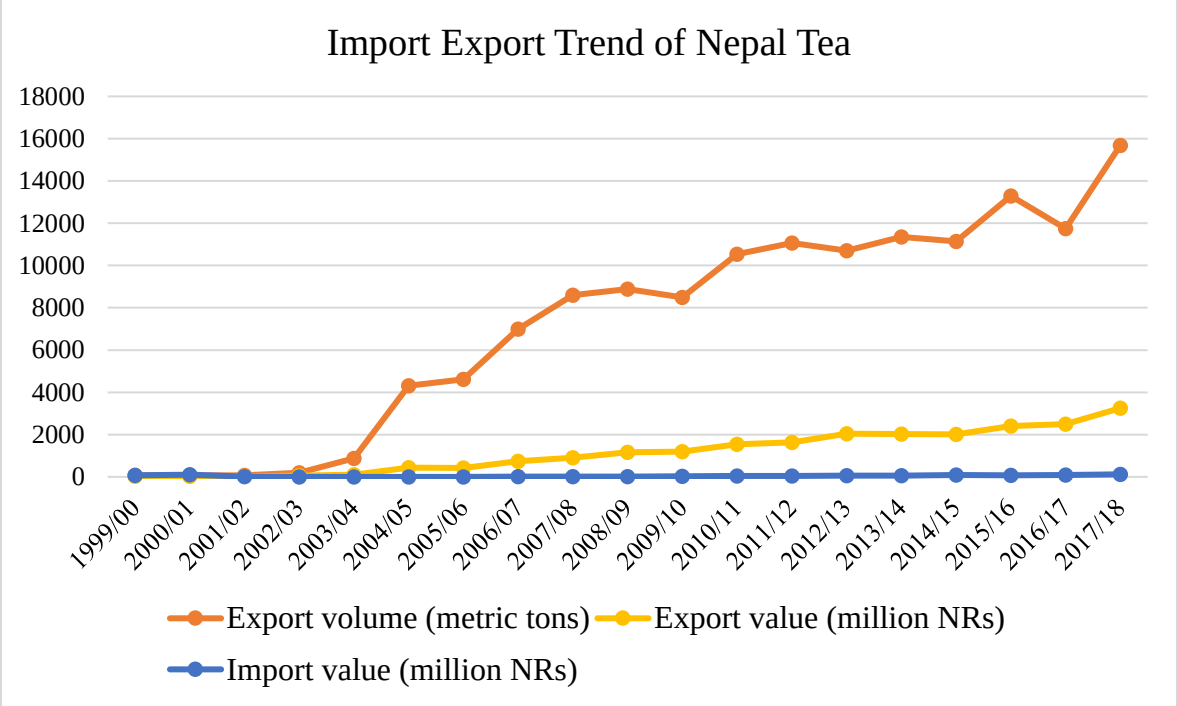
Figure 7: Cost and Margin at Different Level of Supply Chain

Figure 7 shows the net marketing margin received by farmers, processors, and retailers are $0.09, $0.48 and $97.27 per kg respectively. The cost incurred by US retailers is estimated at $100.88 per kg. The study shows that the marketing cost and net profit is higher at retailer level.

6.2 Market Analysis

6.2.1 Nepal Tea Market

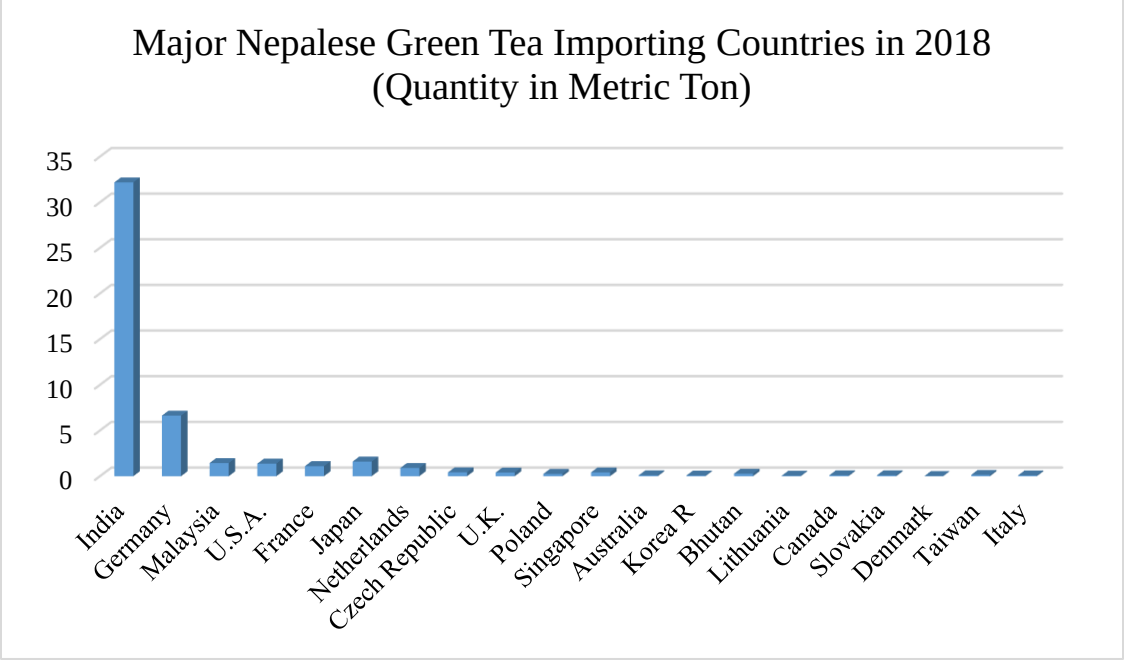
The export trend below illustrates that there is a significant increase in the export holding the import at a constant level within 18 years. Figure 8 shows that the supply was increased significantly from 81.6 metric tons in 2000 to over 15,500 metric tons in 2018 which is expected to increase above 19,000 metric tons by 2023 (Appendix E). Similarly, the export value was increased from NRs 25.7 million in 2000 to NRs. 3,251.7 million in 2018 whereas import value was NRs. 73.3 million in 2,000 and NRs. 120.9 million in 2018.



Source: NTCDB, 2019

Figure 8: Export Import Situation of Nepal Tea (FY 1999/00-2017/18)

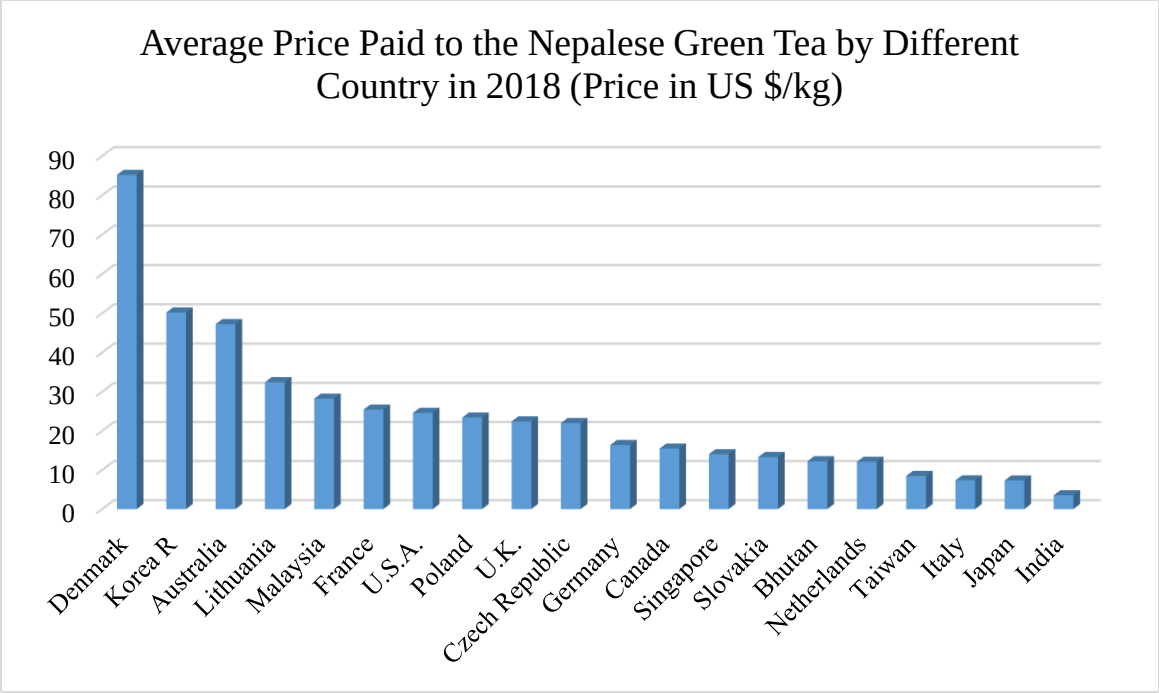
Nepal produces several types of green tea such as premium green, roasted green, perl green etc. The demand for green tea is growing every year. Figure 9 shows that India was the largest Nepalese green tea importing country followed by Germany, Malaysia, USA, France, Japan and the Netherlands in 2018. The data shows that India alone imports above 90 percent of the total export.



Source: TEPC, 2019

Figure 9: Major Nepalese Green Tea Importing Countries in 2018

Figure 10 shows that Denmark offered above $80 in 2018 which is the highest price per kilogram of Nepalese green tea in this year. On the other hand, India paid below $5 in an average which was the lowest price paid for Nepalese tea in 2018. Denmark was followed by Korea, Australia, Lithuania, Malaysia, France and USA. These are the potential high-end market for Nepalese green tea.

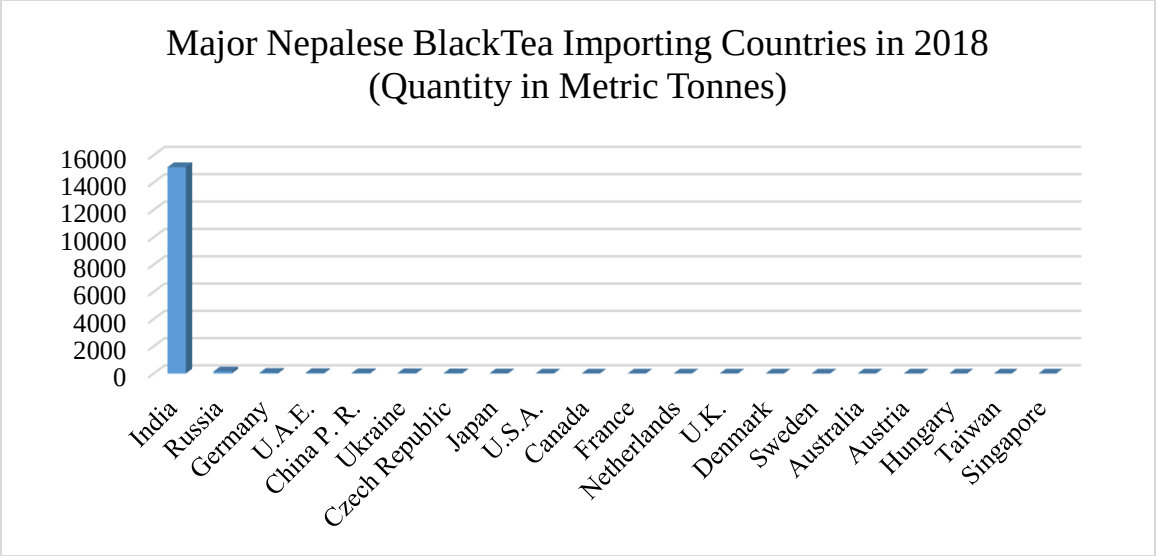


Source: TEPC, 2019

Figure 10: Average Price Paid to Nepalese Green Tea by Different Countries in 2018

Nepal produces varieties of black tea in different seasons such as premium black, spring black, summer black etc. The demand for black tea was found higher in India and then Russia, Germany, United Arab Emirates, China, and Japan. India is found the main buyer of black tea who buys above 90 percent of the total production (Appendix H).

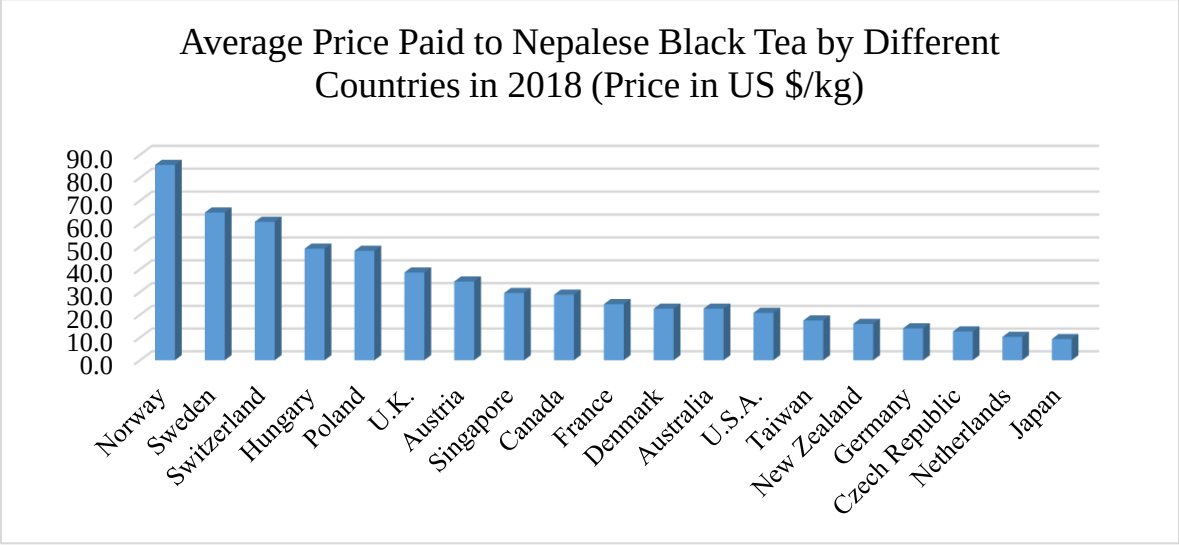
Figure 11 shows that India imported 15,116.65 metric tons of fermented black tea in 2018 which was 97.7 percent of the total export followed by Russia, Germany, United Arab Emirates with 147.17, 51.9 and 41 metric tons respectively.



Source: TEPC, 2019

Figure 11: Major Nepalese black tea importing countries in 2018

Figure 12 shows that Norway paid the highest per unit price for Nepalese black tea followed by Sweden, Switzerland and Hungary in 2018. Norwegian buyers paid $85.58 per kg in average in 2018. Similarly, Sweden, Switzerland and Hungary paid $64.82, $60.75 and $49.06 per kilogram respectively. These are the potential target market for black tea in terms of value.



Source: TEPC, 2019

Figure 12: Average Price Paid to Nepalese Black Tea by Different Countries in 2018

6.2.2 Marketing Channel

Nepal has no auction market, warehouse or naval port. Large quantity shipping is done via India. As shown in Figure 13, there are mainly three types of marketing channels found in the orthodox tea supply chain.

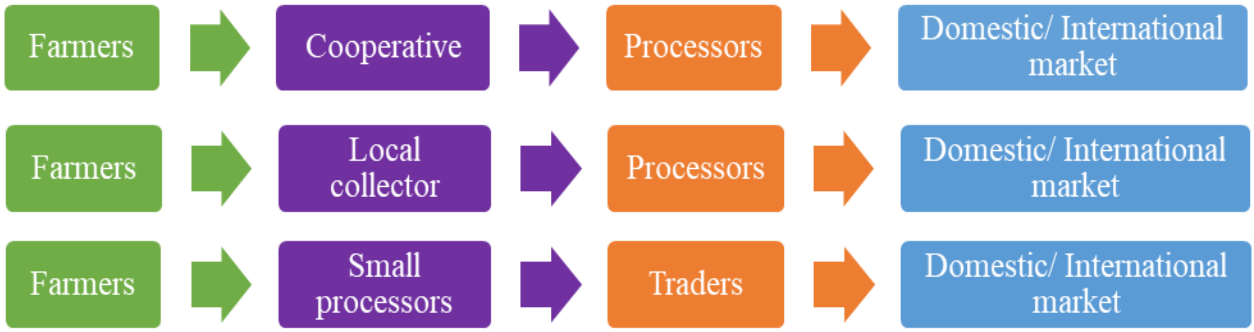


Figure 13: Existing Marketing Channel of Nepalese Orthodox Tea Industry

The farmers usually sell their green leaves to the processors either through cooperatives or through local collectors. Some farmers sell their green leaves individually to the small processors. The cooperatives and the local collectors collect the green leaves from farmers and sell to the processors on a commission basis. Usually, cooperatives or local collectors receive one rupee per kg as commission from processors. Fifteen cooperatives have their own processing unit and they buy the green leaves from their members and sell the made tea either directly or through CTCF to the local and international market. The processors trade their products either directly or through HIMCOOP or STAN or some other traders. Small processors sell their products either directly or through big processors or some local traders. The big processors and some small specialty tea processors usually trade their products in the international market whereas other small processors sell their products in the domestic market. Normally, the high-quality tea exported to American and European countries whereas the normal and low-quality products exported to India at low price. In recent years, orthodox shops and sales outlets have been opening in many urban and tourist cities like in Ilam, Dharan, Kathmandu, and Pokhara. These cities are major wholesale and

retail markets for orthodox tea. STAN and HIMCOOP have their own sales outlet in Kathmandu. CTCF has its sales outlet in Ilam through which they are selling their member's tea in the domestic and international markets. These commodity associations are also the main contact points for major buyers and stakeholders. These days, different types of tea are also available in supermarkets and some groceries. There is no data available on domestic consumption, but the opening of sales outlets and consumer awareness about health benefits indicate that there is tremendous potential to promote Nepalese orthodox tea in the domestic market. The average retail price of black and green tea in the domestic market was observed at $10 and $15 per kg.

6.2.3 Average Market Price

Table 6 shows the average consumer price of Nepalese tea (green and black) in the US market collected on September 23, 2019, from the official website of tea retailers who are selling Nepalese orthodox tea in the US market. It shows that the retail price of Nepalese green varies from $105.83 to $268 per kg and black tea price ranges from $159.45 to $265.27. However, these prices fluctuate based on quality, season, raw materials cost, types of tea produced etc.

Table 6: Average Consumer Price of Nepalese Tea in the US Market in 2019

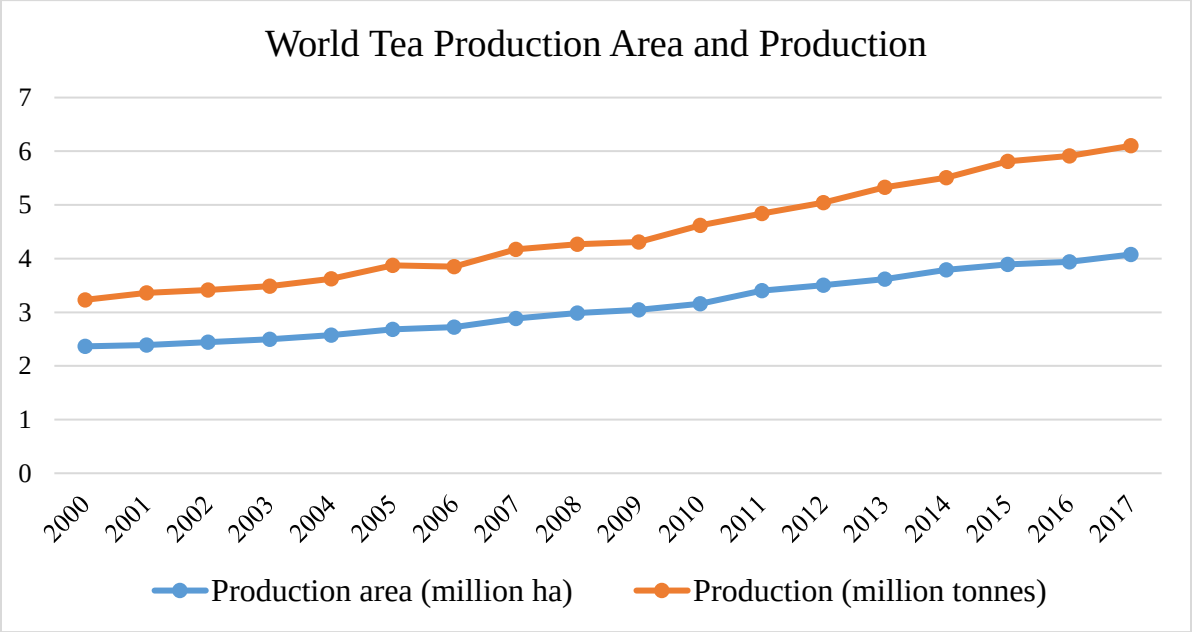
Company	Green tea price (US $/kg)	Black tea price (US $/kg)
Arbor Teas	105.83	218.71
Nepal Tea LLC	268.10	208.83
Nepal Tea Traders	211.66	265.27
Upton Tea	180.61	180.61
Tea Box	152.39	180.61
Discover Nepal Tea	159.45	159.45
Average (US $/kg	179.67	202.25

Source: Individual Company's Website visited on October 06, 2019

6.2.4 Global Tea Market Overview

6.2.4.1 Production

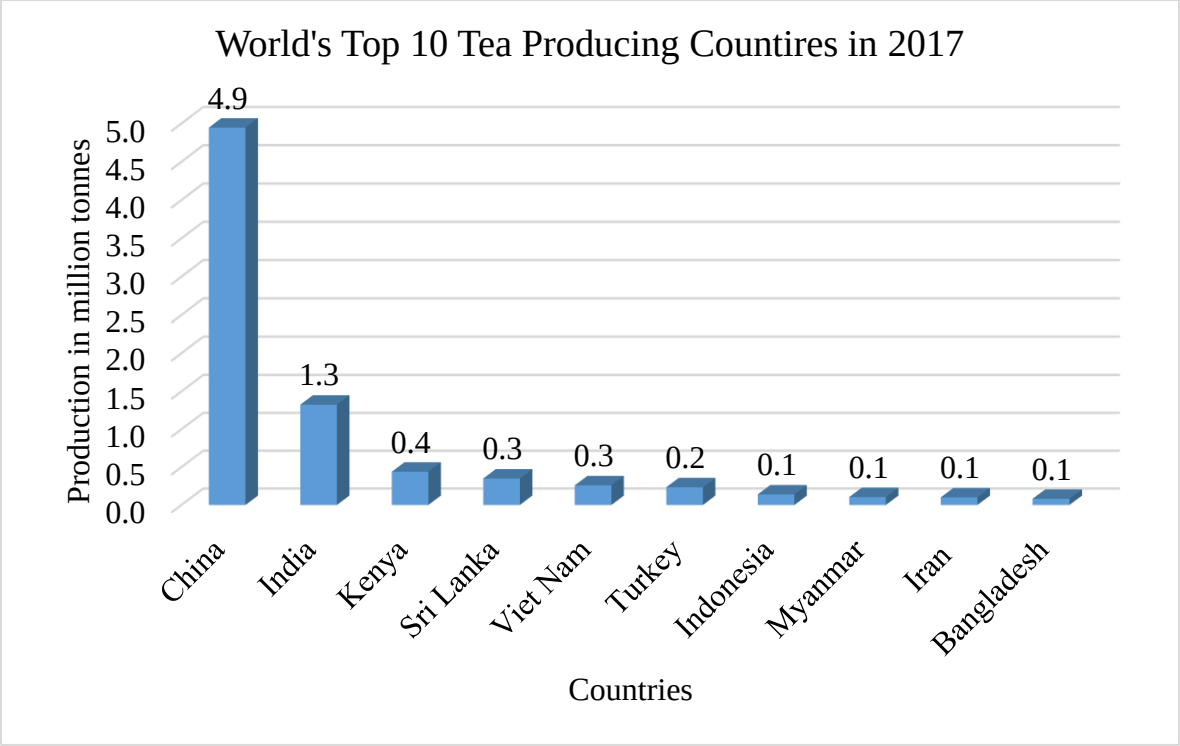
World tea production and consumption are increasing at about 4.5 percent annually over the last decade (FAO, 2018). Figure 14 shows that global tea production increased from 3.23 million tons in 2000 to 6.1 million tons in 2016.



Source: FAOSTAT, 2019

Figure 14: World Tea Production Area and Production Trend from 2000 to 2017

Figure 15 shows that China, India, Kenya, Sri Lanka, Vietnam, Turkey, Indonesia, Myanmar, Iran, and Bangladesh are top tea producing countries in the world. China including mainland and Taiwan accounted for 57.69 percent of world tea production.

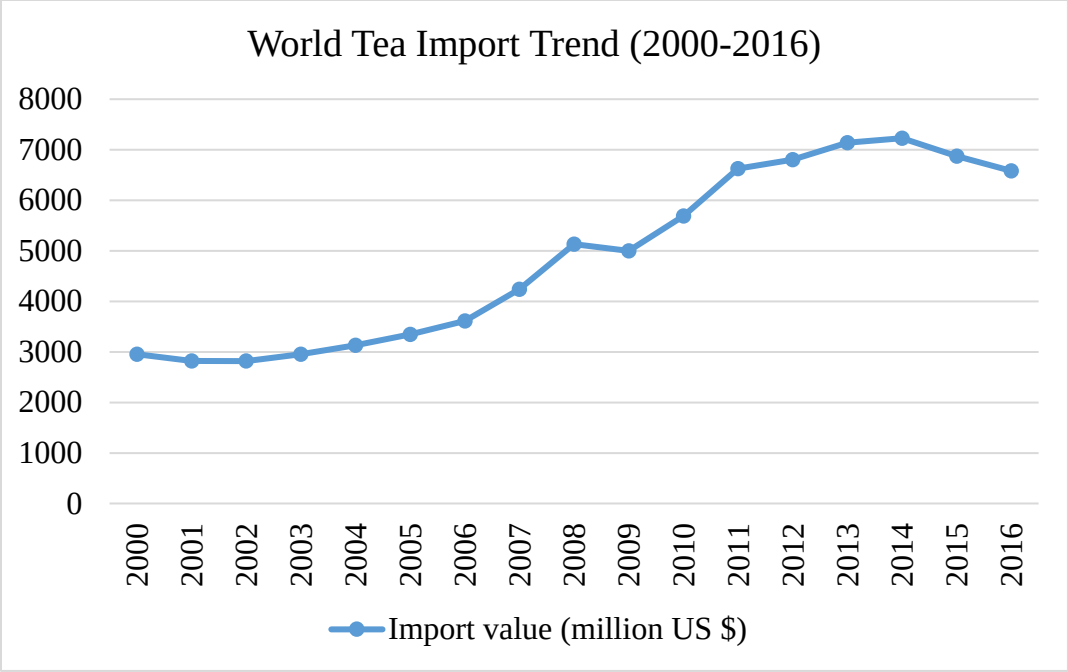


Source: FAOSTAT, 2019

Figure 15: World's Top 10 Tea Producing Countries in 2017

6.2.4.2 Global Supply

Looking at the global market, Figure 16 illustrates that the global demand is increasing since the global supply is in increasing trend. The world tea import increased annually by 1.4 percent over the last decade (FAO, 2018). The import was valued at $2.9 billion in 2000 and reached $6.34 billion in 2016.



Source: FAOSTAT, 2019

Figure 16: World Tea Import and Export Trend from 2000 to 2016

6.2.4.3 Market Growth

Table 7 gives information about market volume and revenue growth trends of coffee, tea and cocoa in the global market from 2000 to 2023. The statistics indicate that the market growth rate of tea is higher than that of coffee and cocoa market in terms of volume and revenue generated. The increasing global population, associate health benefit, increasing awareness among people for losing weight, expanding retail and online market and product diversifications like RTD tea, flavored tea and Iced tea are the major driving force for increasing global tea demand.

In general, the coffee has the largest global market segment however the table shows that tea has the highest revenue growth over the last decade among hot drinks market. The market volume of tea accounted for 4878 million kg in 2018 and is expected to reach to 5515.8 million kg by 2023 with a CAGR of 3.40 percent. Similarly, the revenue of tea accounted for $84731 million

in 2018 and is expected to reach $115849 by 2023 with the compound annual growth rate of 9.30 percent.

Table 7: Market Volume and Revenue Growth of World's Hot Drink Market (2010-2023)

	Volume in million kg				Revenue in million US$			
Product	2010	2018	2023	CAGR	2010	2018	2023	CAGR
Coffee	4905.2	5935.2	6667.2	2.40%	55811	84250	107572	5.20%
Tea	3574.2	4878	5515.8	3.40%	36653	84731	115849	9.30%
Cocoa	869.2	1325.2	1234.4	2.70%	4234	9961	10910	7.60%
Total	9348.6	12138.3	13417.4	2.80%	96698	178942	234331	7%

Source: STATISTA, 2019

6.2.4.4 Price

Table 8 shows that the market price of tea is higher than the other two hot drinks with a CAGR of 5.7 percent from 2010 to 2023.

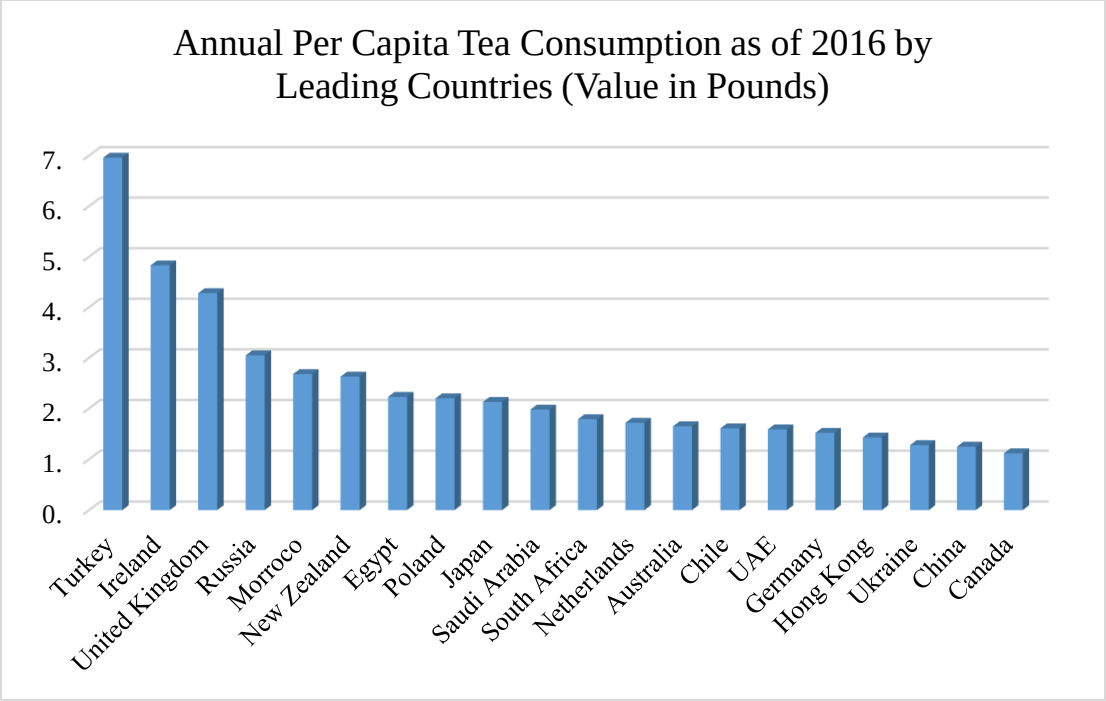
Table 8: Global Market Price of Tea Per Kilogram and CAGR (2010-2023)

Product	2010	2018	2023	CAGR
Coffee	11.38	14.2	16.13	2.7%
Tea	10.25	17.37	21	5.7%
Cocoa	4.87	7.52	8.84	4.7%
Total	10.34	14.74	17.46	4.1%

Source: STATISTA, 2019

6.2.4.5 Consumption

Figure 17 indicates that Turkey was the largest tea consuming country in the world as of 2016 with an average annual per capita tea consumption of just below 7 pounds per person followed by Ireland, UK, Russia and Morocco. Except Japan and China, most of the countries import tea from tea producing countries. The TEPC and ITC trade data shows that Nepal has not exported tea to Ireland, Morocco, New-Zealand, Egypt, Poland, Saudi Arabia, South Africa, and Chile. Nepalese traders need to assess the market of these countries.

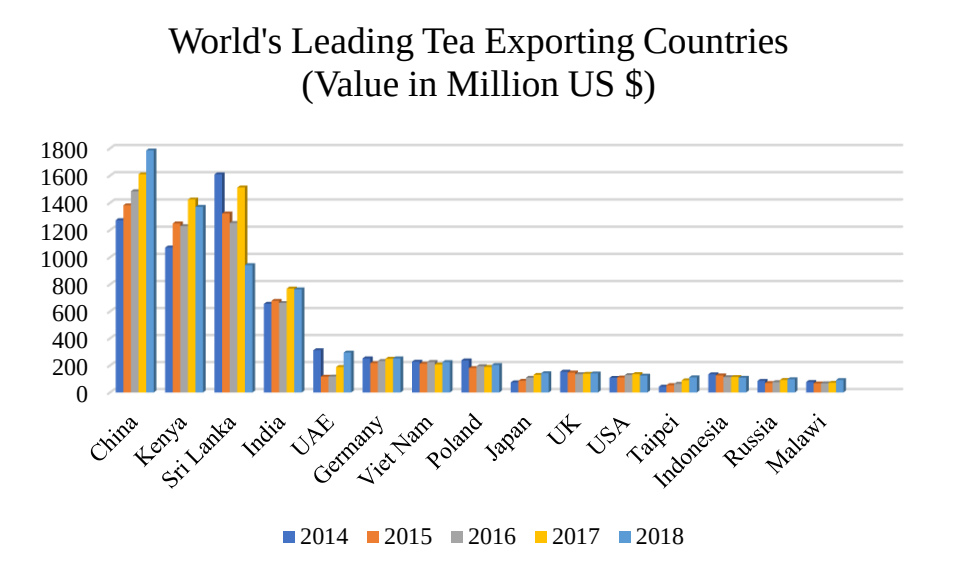


Source: STATISTA, 2019

Figure 17: Annual Per Capita Tea Consumption as of 2016 by Leading Countries

6.2.4.6 Major Competitors

China was the largest tea exporting country in the world in terms of value in 2018 with the global market share of 23 percent. China exported 0.36 million tons of tea worth $1.7 billion in 2018. But Kenya was the largest tea exporter in 2018 by volume with the export volume of 0.50 million tons of tea valued at $1370.49 million. Sri Lanka, India, UAE and Germany ranked third, fourth, fifth and sixth leading tea exporting countries in the World (Appendix L). UAE and Germany have no production. These countries import tea from India, Sri Lanka, China, Kenya and re-exported to other countries. Figure 18 shows that the export trend of China and India is in increasing trend. Kenya's export value was slightly decreased in 2018 however the data shows that the export volume was increased this year.

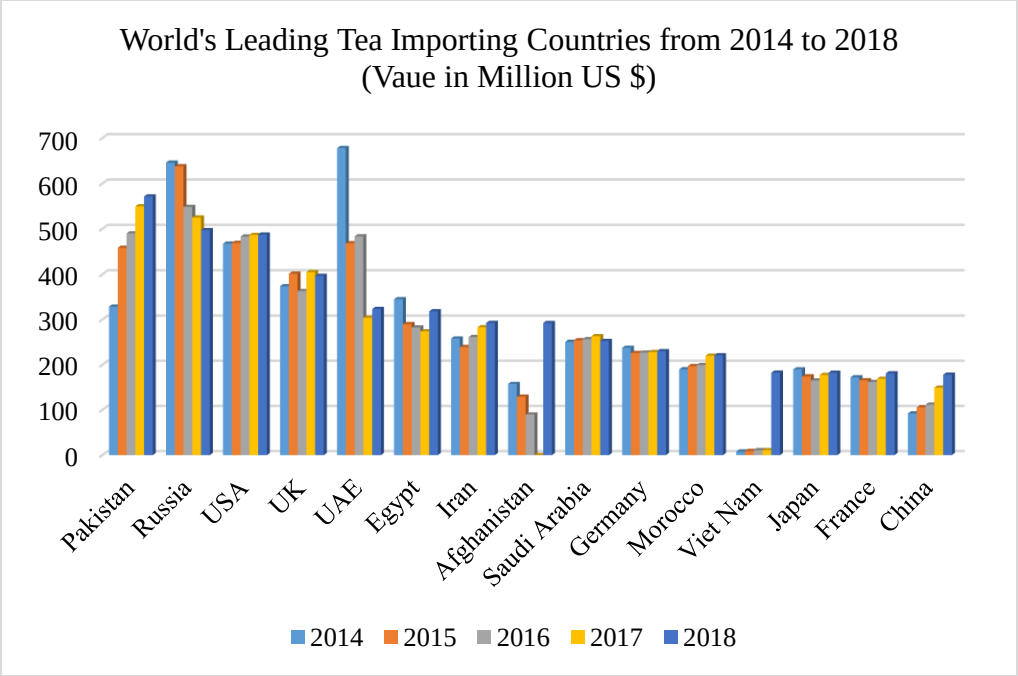


Source: ITC Trade Map, 2019

Figure 18: World's Leading Tea Exporting Countries from 2014 to 2018

6.2.4.7 Target Market

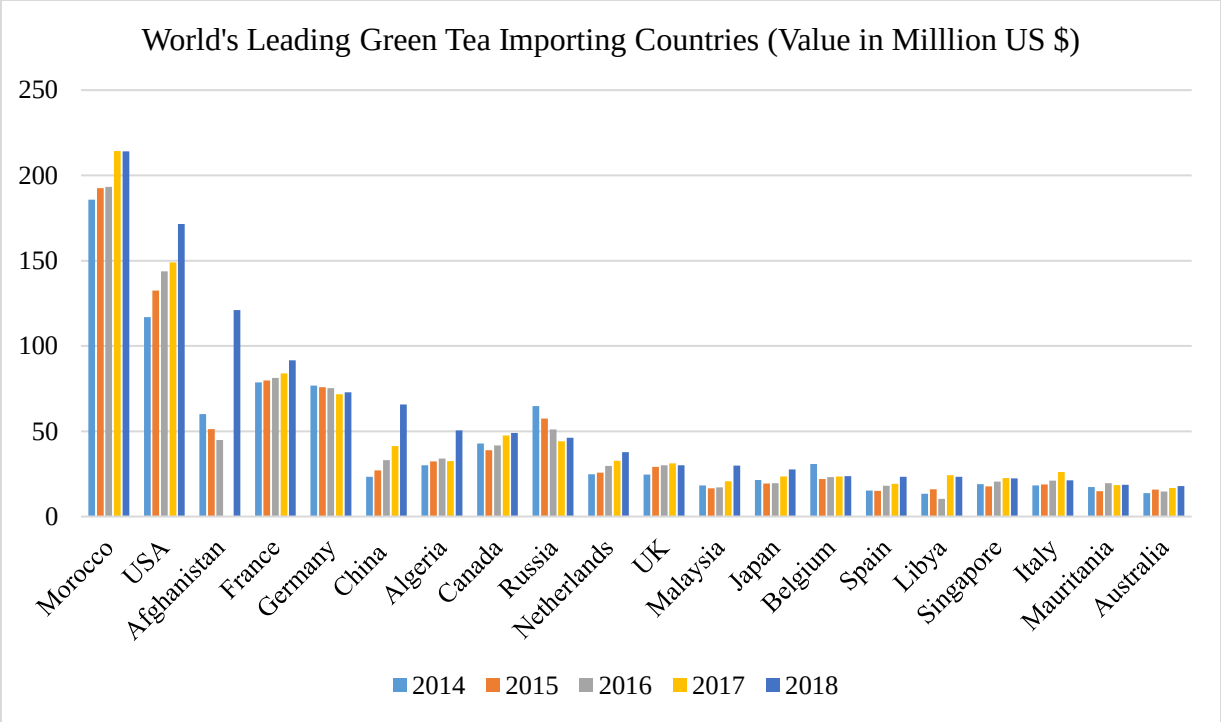
Pakistan was the largest tea importing country in the world in 2018, accounting for 7.7 percent of the world's total import. Pakistan imported 1.9 million tons of made tea valued at $571.32 million. Russia, USA, UK, UAE, Egypt, Iran and Afghanistan are other leading importing countries. Russia was the top importing country till 2016 but the import started decreasing from 2017 and now it remains in the second largest importing county in the World. There is exponential market growth in Afghanistan in 2018. Figure 19 shows that the import trend of Pakistan, USA, Iran, Morocco, and China is continuously increasing.



Source: ITC Trade Map, 2019

Figure 19: World's Leading Tea Importing Countries from 2014 to 2018

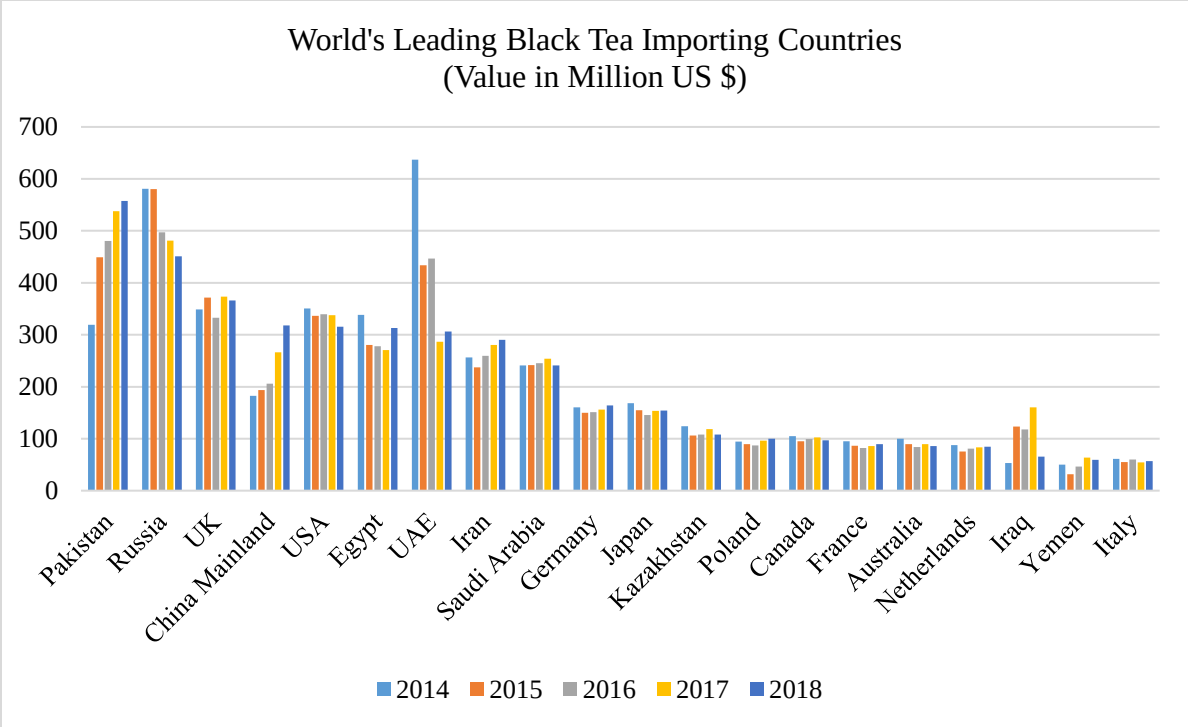
By type, green tea demand is higher in Morocco, the USA, France and Germany. Figure 20 shows Morocco as the leading importer of green tea, valued above $200 million followed by USA and Afghanistan valued at $171 and $121 million in 2018. France, Germany, China, Algeria, Canada, Russia are other major green tea importing countries in the world. These countries could be the potential markets for Nepalese green tea. The import data shows that the green tea market is growing.



Source: ITC Trade Map, 2019

Figure 20: World's Leading Green Tea Importing Countries from 2014 to 2018

Figure 21 shows that Pakistan was the largest black tea importing country in 2018 with an import value of above $550 million followed by Russia, UK, China Mainland, USA, Egypt, UAE, Iran, Saudi Arabia, Germany, China and Japan. These countries could be the target market for Nepalese black tea. The black tea market is growing in Pakistan, Iran, Germany and China whereas, Russia and the US market is in decreasing trend. The tea market was highly volatile in UAE and Iraq. The rest have almost stable market.



Source: ITC Trade Map, 2019

Figure 21: World's Leading Black Tea Importing Countries from 2014 to 2018

6.2.4.8 Market Segments

Figure 22 shows the global tea segments based on farming, manufacturing process, grade, types, season, geography, marketing channel and packing types.

By manufacturing process, tea is classified as CTC (Crush, Tear and Curl) and Orthodox also called loose leaf tea. The CTC is typically drink with milk and sugar whereas orthodox is drink without milk and sugar. By farming types, the tea is classified as organic certified or organic by default and non-organic. The organic products have higher market value than the other two categories of tea. The European and North American market is dominated by organic and leaf grade orthodox tea whereas Asian market like India, Bangladesh, Pakistan consume more CTC tea. Based on the season Spring flush, also called first flush tea which is produced in spring between March to the mid of May is considered as the best quality tea. Based on the grade, tea is

categorized as leaf grade, broken, fanning and dust. The leaf grade tea is the top-grade tea which is available either in small plastic or paper packet or in an aluminum or paper or plastic container. The fanning and dust are normally packed in a tea bags or used for making iced tea. Based on the type, black and green tea are more common in the global market. The Oolong, white, herbal/fruit tea and iced tea market are also growing rapidly in recent years. The ITC Trade Map data shows that the market share of black tea is higher among all types. The supply of black tea was recorded at 1.4 million tons in 2018 whereas green tea was recorded at 0.4 million tons only. Among the distribution channel segment, supermarket/Hypermarket is the largest marketing channel in the global tea market.

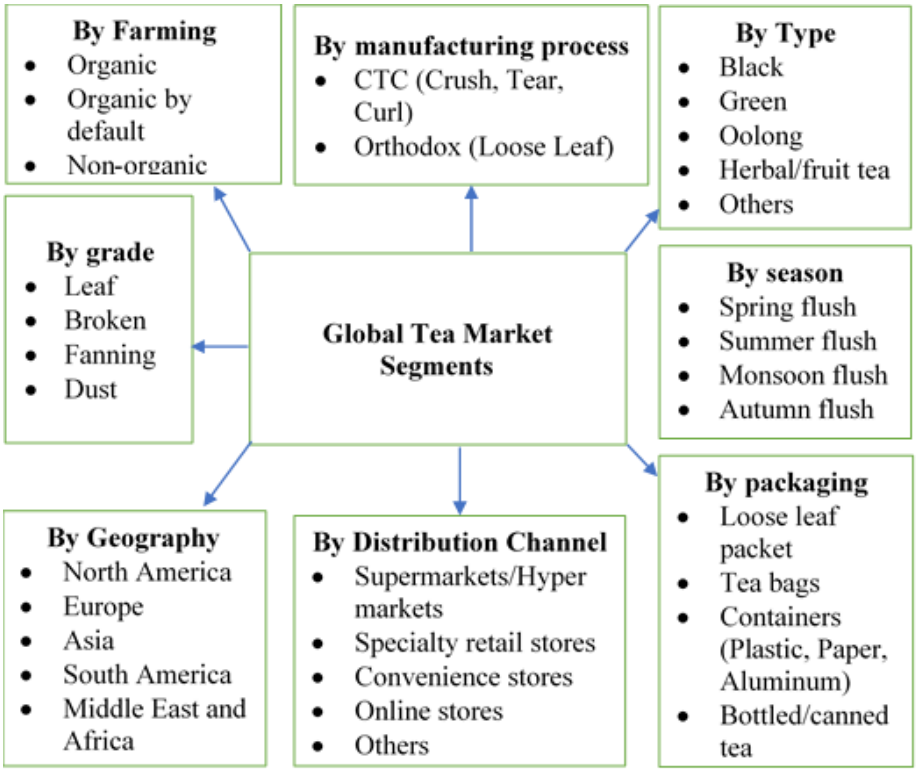
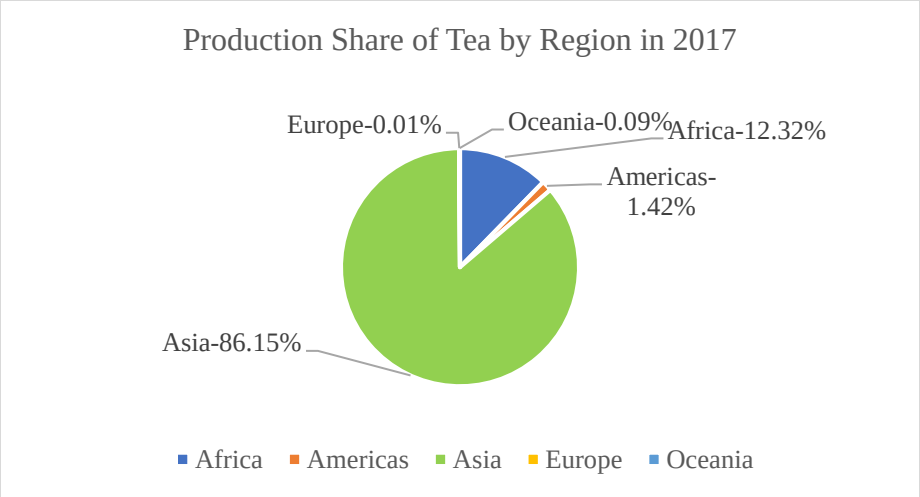


Figure 22: Global Tea Market Segments

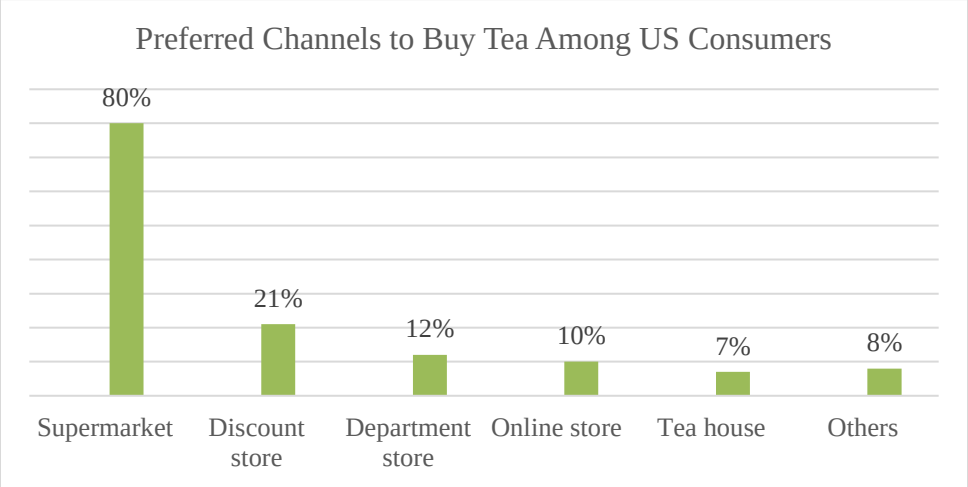
By geography, Asian countries produce more than 80 percent while Europe produces less than one percent of the World's total production.



Source: FAOSTAT, 2019

Figure 23: Production Share of Tea by Region in 2017

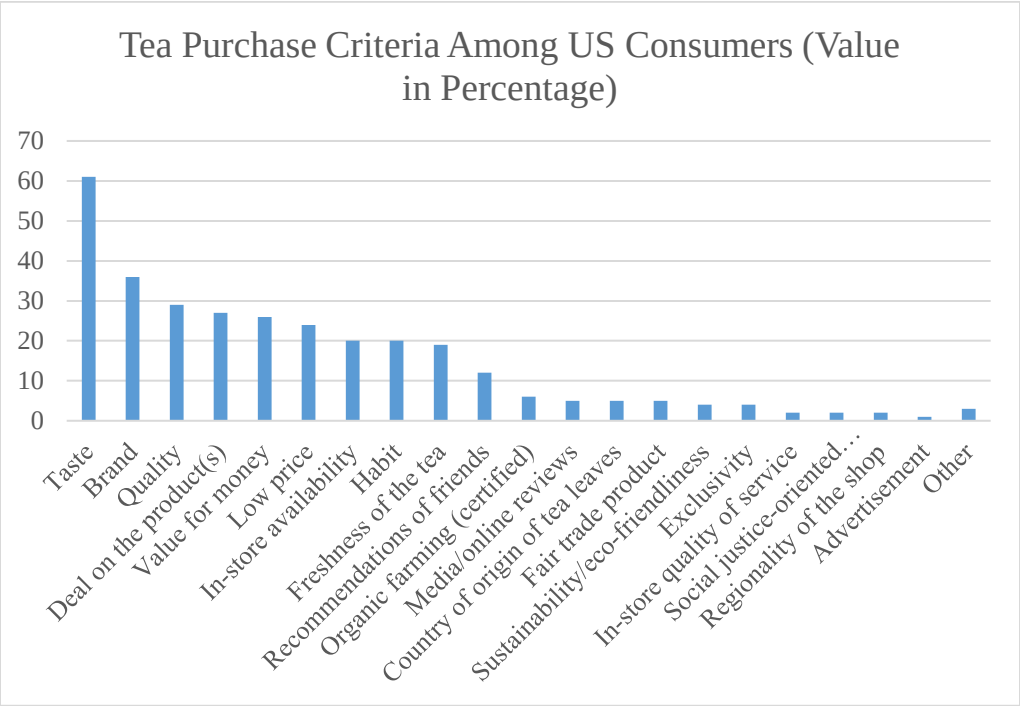
The STATISTA, a popular German online portal for statistics, surveyed on the preferred channel to buy tea among US consumers in 2017. There were 810 respondents of age 18 years and older who drink tea at home. The survey results found that 79 percent of the respondent buy the tea in supermarkets followed by discount store, department store and online retailers. This, survey suggests that the supermarket could be the best marketing channel for Nepalese tea.



Source: STATISTA, 2019

Figure 24: Preferred Channels to Buy Tea Among US Consumers

Figure 25 illustrates the purchase criteria for tea among consumers in the United States as of February 2017. The survey result shows that 61 percent of the respondents preferred taste as an important purchase factor.



Source: STATISTA, 2019

Figure 25: Tea Purchase Criteria Among US Consumers

Table 9 represents the consumers' ratings about the taste of Nepalese tea where five stars is the highest score and one star is the lowest score.

Table 9: Consumers' Rating About the Taste of Nepalese Orthodox Tea

Company	No. of consumers	Rating				
		★★★★★	★★★★	★★★	★★	★
Teegschwendner	567	446	97	18	6	0
Arbor Tea	31	20	9	1	1	0
Nepal Tea Traders	50	50	0	0	0	0
Nepal Tea LLC	35	34	1	0	0	0
Teabox	35	19	14	2	0	0
Total	718	569	121	21	7	0
Rating Percent	**100**	**79.2**	**16.9**	**3.7**	**5.8**	**0**

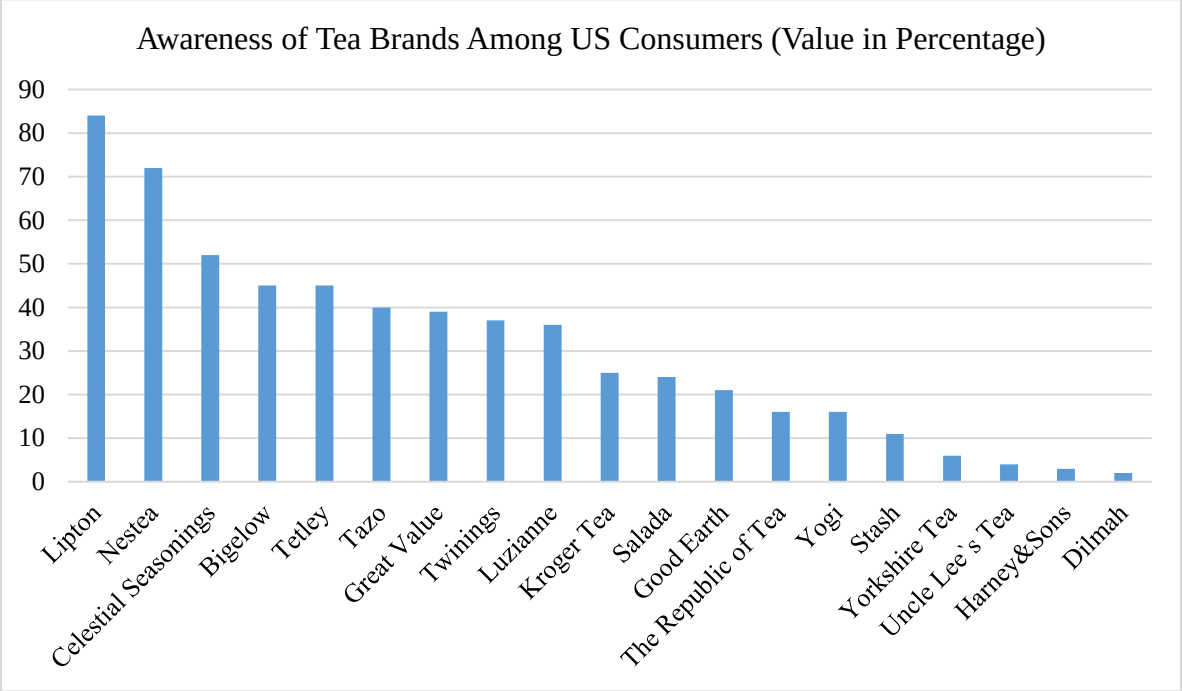
The data was collected from five Nepalese tea retailers who are selling different types of Nepalese tea, particularly in the North American and European market through e-commerce. The data was collected on September 30, 2019. The Arbor tea, Nepal Tea Traders, Nepal Tea LLC are based in the USA. Teegschwendner is based in Germany and the USA and Teabox is the global online tea marketing company. In total, 718 consumers evaluated the taste of different types of Nepalese tea on the official website of these selected companies. About 79 percent of the total respondents rated as the best tea in terms of taste and aroma and about 17 percent of respondent rated as very good. No one rated as low quality tea. It provides evidence that Nepalese tea is excellent in taste which US consumers preferred.

Table 10: Global Tea Championship Award Received by Nepalese Orthodox Tea from 2012 to 2019

Year	Award/Competition	Category	Name of the Company	Product	Place
2012	North American Tea Championship Award	Flavored green tea	Sandakphu Tea	White	2nd
2013	North American Tea Championship Award	Fall Hot Tea Class	Nepali Tea Traders	Black tea	1st
2014	North American Tea Championship Award	Fall Hot Tea Class	Nepali Tea Traders	Black tea	1st
2015	North American Tea Championship Award	Fall Hot Tea Class	Nepali Tea Traders	Oolong tea	2nd
2017	Global Tea Championship Award	Fall Hot Loose Leaf	Guranse Tea	Black tea	2nd
2017	Global Tea Championship Award	Hot Spring Loose Leaf	Guranse Tea	White tea	2nd
2017	Global Tea Championship Award	Hot Spring Loose Leaf	Antu Vallley	White tea	3rd
2018	Global Tea Championship Award	Loose Leaf Hot Competition	Antu Vallley	White tea	3rd
2019	Global Tea Championship Award	Spring hot-loose leaf	Nepal Tea LLC	White	3rd
2019	Australian Golden Leaf Award	Golden leaf award	Discover Nepal Tea	Silver tips	1st

Source: Global Tea Championship

Table 10 proved that Nepal produces high quality tea. Some individual companies were participated in the Global Tea Championship competition formerly known as North American Tea Championship Competition and Australian Tea Competition in the past where they were able to achieve the following positions.



Source: STATISTA, 2019

Figure 26: Brand Awareness Among US Consumers

Figure 26 shows the awareness of tea brands among consumers in the United States as of February 2017. The survey results revealed that more than half of the respondents said they were familiar with Lipton and Celestial Seasonings. Similarly, they were also aware of other brands like Bigelow, Tetley, Tazo, Great Value, Twinings, Luzianne, Kroger, Harney and Sons, and Dilmah. It indicates that these brands are key leading players commonly available in the US market. But they do not sell Nepalese products directly. This analysis informs Nepalese traders for possible market chain linkage with these companies in coming days.

Chapter 7: Conclusion

Orthodox tea has become a major high value and export potential commodity in Nepal. The agricultural development strategy (2015-2035) and National Trade Integration Strategy 2016 have given priority for its commercialization and trade. It is the major source of income of over 70,000 Nepalese people. At present, over 15,000 small farmers and 152 processing firms are directly involved in this industry. The country has been producing over 24,000 metric tons of CTC and orthodox tea since 2016.

The global tea market is growing rapidly over the last two decades which provides a market opportunity for Nepal tea. However, Nepalese tea firms are unable to compete in the global tea market. There is no empirical study found about Nepal tea industry, production and market potential. Thus, this study conducted industry analysis, financial analysis and market analysis of Nepal orthodox tea industry. The aim of this study is to investigate the industry's current position and performance including production and market potential so that the firms can improve their performances and efficiencies in production and market.

The results of the industry analysis revealed that there is high competition among processors particularly for green leaves and skilled manpower. The bargaining power of input suppliers and tea buyers was found to be high. In this situation, processors are losing their profit. Besides that, the study found several binding constraints such as low production and productivity, inefficient use of available resources such as machines and other inputs, low economies of scale, lack of entrepreneurship skills, inadequate service providers, lack of market infrastructure such as auction market, warehouse and blending facility, unorganized supply chain system, limited access to international market, insufficient government support programs. However, this study claims that the industry is economically profitable and viable because of high production and market potential.

The threat of product substitution is low. There are high barriers to entry into this industry making the threat of new entrants low. Moreover, the products have several competitive advantages such as unique taste, quality tea from the Himalaya, competitive price, wide range of products and small farmers' premium tea.

The results of financial analysis indicate that the average annual production and capital investment of processing firms were 38,981 kg and $126,469. The average production cost and factory gate price were found to be $5.58 and $6.06 per kg, and the average benefit-cost ratio and return on investment were 1.08 and 13.33 percent. The net marketing margin received by farmers, processors and retailers was found to be $0.09, $0.48 and $97.27 per kg respectively. The production function result depicted that a one percent increase in the investment in capital, labor and raw material could increase revenue by 0.20 percent, 0.12 percent and 0.68 percent respectively. Furthermore, the marginal cost of production was estimated at $3.24 per kg. The factor productivity analysis predicted that if other factors of production remain constant, a one dollar increase in the labor and capital can generate $11.53 and $5.38 respectively. On the other hand, the study found that that the raw materials are overutilized, but the capital and labor are not utilized properly. The average capacity utilization of the processing firms was about 33 percent. Even though, the results of the financial analysis show that there is positive return on the investment and increasing returns to scale. Thus, this study revealed that the processing firms could reduce their processing costs by increasing production.

The market analysis results exhibited that the global tea market is growing with the annual compound growth rate of 3.4 percent by volume, 5.7 percent by price and 9.3 percent by value. The growth rate is found higher than that of coffee and cocoa. Nepalese tea market is also increasing significantly which was 81.6 metric tons in 2000 and reached over 15,500 metric tons

in 2018. However, Nepalese firms are over-dependent to the low-priced Indian market. More than 90 percent of the total market is dominated by few Indian players in 2018. At the same time, India is also a competitor of Nepal tea for the international market. On the other hand, Denmark, Norway, South Korea, Sweden, Switzerland, Australia, Hungary, France, the USA and, the UK are potential markets for premium Nepalese tea whereas Pakistan, Afghanistan, UAE, Saudi Arabia, Russia, Morocco, and Turkey are the potential markets for volume export. The average selling price of Nepalese tea was found to be $6.06 per kg. More importantly, the Global Tea Championship Competition has been awarded different types of Nepal tea as first, second or third position since 2012. It is noteworthy that the US consumers evaluated Nepalese orthodox tea as an excellent product which gives a positive message to the global tea connoisseurs. These factors indicate that Nepal can compete with the major global tea exporting countries.

The findings of this study have a potential to inform the decisions of Nepalese tea industry stakeholders as well as policy makers. This study could be a relevant source of information to the government of Nepal, policymakers, related stakeholders and development organizations for tea sector development related program planning and implementation. It could be relevant for the researcher for their research studies in the area of tea production and processing. This study has not conducted in-depth market survey particularly to know the consumer preferences on various attributes of tea. Furthermore, this study has not conducted empirical study on market segments These could be further research works in the future.

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Appendix A: Production Area and Production of Nepal Tea (FY 1999/00 to 2017/18)

Fiscal year	Plantation (ha)	Production (metric ton)
1999/00	10,249	5,085
2000/01	11,997	6,638
2001/02	12,346	7,519
2002/03	12,643	8,198
2003/04	15,012	11,651
2004/05	15,900	12,606
2005/06	16,012	13,688
2006/07	16,420	15,168
2007/08	16,594	16,127
2008/09	16718	16,208.127
2009/10	17127	16,607.555
2010/11	17451	17,437.933
2011/12	18149	18,309.824
2012/13	19036	20,588.145
2013/14	20120	21,076.366
2014/15	26165	23,186.726
2015/16	27688	24,263.744
2016/17	28241	24,409.326
2017/18	28595	24,803.612

Source: NTCDB, 2019

Appendix B: List of Tea Processing Firms in Nepal as of 2018

Appendix B.1: List of Medium and Large Processing Firm (>50 tons/year production)

SN	Name of processing firm	Address
1	Aayus Tea Processing Pvt. Ltd.	Fikkal Bazaar, Ilam
2	Everest Tea Estate Pvt. Ltd	Bhotechaur, Sindhupalchok
3	Ganesh Himal Tea Industry	Sri Antu, Ilam
4	Gorkha Tea Estate Pvt. Ltd	Sundarpani, Ilam
5	Gramin Tea Estate	Gairigaun, Phikkal, Ilam
6	Guranse Tea Estate	Hile, Dhankuta
7	Himalaya Range Tea Factory	Kanyam, Ilam
8	Himalayan Sangrila Tea Industry	Sakhejung, Ilam
9	Ilam Chiyabari Tea Factory	Panchakanya, Ilam
10	Ilam Tea Producer Pvt. Ltd	Sri Antu, Ilam
11	Ilam Tea Producer Pvt. Ltd	Panchakanya, Ilam
12	Ilameli Tea Cooperative	Phikkal, Ilam
13	Jaubari Tea Estate Pvt. Ltd	Godak, Ilam
14	Kanchanjangha Tea Estate and Research Center	Phidim, Panchthar
15	Kanchanjungha Organic Tea Factory	Sakhejung, Ilam
16	Kanyam Tea Cooperative Processing Factory	Suryodaya-11, Ilam
17	Kuwapani Tea Estate	Hile, Dhankuta
18	Laxmi Tea Industries	Laxmipur, Ilam
19	Mai Tea Company Pvt. Ltd.	Jasbire Ilam
20	Mangal Tea Industry Pvt. Ltd.	Kanyam 2 Ilam
21	Mechi Valley Tea Factory	Barbote, Phikkal, Ilam
22	Mist Valley Tea Industry	Jitpur, Ilam
23	Narayani Tea Estate	Hile, Dhankuta
24	Nepal Organic Tea Industry Pvt. Ltd.	Sulubung, Ilam
25	Nepal Small Tea Producer Factory	Phikkal, Ilam
26	Nepal Tea Development Corporation	Kanyam, Ilam
27	Samal Valley Tea Factory	Samalbung, Ilam
28	Sankhejung Hill Range Tea Factory	Sankhejung, Ilam
29	Siddibinayak Tea Industries Pvt. Ltd.	Suryodaya-Fikkal , Ilam
30	Siddadevi Tea Estate Pvt. Ltd	Fakfok, Ilam
31	Singhadevi Tea Producer Cooperative Ltd.	Laliguras 11, Terhathum
32	Sunmai Tea Factory	Suryodaya-11, Ilam
33	Targaun Tea Estate Pvt. Ltd	Targaun, Ilam

Appendix B.2: List of Small Processing Firm (<50 ton/year production)

S.N.	Name of Small Orthodox Tea Processors	Address
1	Aagejung Tea Production Cooperative	Panchami -1 Gopetar, Panchthar
2	Aiselu Tea Producer Cooperative Society	Tharpu- 9 Aiselu Panchthar
3	Ajambare Himchuli Tea Producers	Siddhithumka -5, Ilam
4	Ambote Handmade Tea Industries	Jeetpur-1, Ilam
5	Aroma Nepal Tea Industry (North Nepal)	Sarangdada, Panchthar
6	Aroma Specialty Tea Industries	Suryodaya-10, Ilam
7	Baneshwar Tea processing Pvt. Ltd	Chainpur-16 Kharang, Sankhuwasava
8	Barboteli Tea Cooperative	Barbote, Ilam
9	Bardu Valley Tea Estate Pvt. Ltd	Laxmipur, Ilam
10	Bhotnagi Tea Cooperative	Mantali 4 Ramechap
11	Biraj Orthodox Tea Industry	Deumai Municipality-3, Ilam
12	Bokre Danda Orthodox Tea Processing Pvt. Ltd	Laliguras 11, Terhathum
13	Brothers Orthodox Tea Producers Pvt. Ltd	Deumai Municipality -5, Ilam
14	Buddamani Tea Industries	Deumai, Ilam
15	Chahana Hand Tea Industries	Suryodaya 11, Kanyam, Ilam
16	Chandhunga Tea Cooperative	Mahankal Rural Municipality 5 Lalitpur
17	Changba Tea Industry	Deumai Municpality 7, Jeetpur Ilam
18	Charkhola Orthodox Tea Producers Industries	Chamaita -3 Chauri
19	Cooper Mountain Exclusive Tea Company	Pashupatinagar-4
20	Dajubhai Handmade Tea Processing	Nayabazar-5, Ilam
21	Deurali Small Tea Producers	Suryodaya-12, Ilam
22	Divine Tea Industry	Suryodaya Municipality -11, Ilam
23	Dolakha Green Tea Processing industries Pvt. Ltd	Suryadaya Municipality- 7
24	Everest Tea Cooperative	Mahankal Rural Municipality 5 Lalitpur
25	Everest Tea Industry	Suryadaya Municipality 8 Ilam
26	First Hour Orthodox Tea Processing Industries	Ilam Municipality 1 Sakejung Ilam
27	Gajurmukhi Hand Tea Processing industry	Sakhejung -7 Ilam
28	Gajurmukhi Tea Processing Firm	Gajurmukhi-7, Ilam
29	Greenhill Orthodox Tea Processors Pvt. Ltd.	Sakhejung 4 Ilam
30	Guphathumki Organic Tea Manufacturing	Shantidanda-7, Ilam
31	Hattidhungga Organic Tea Processing	Sangrumba-3, Ilam
32	Himalaya Orthodox Tea Processing Cooperative	Diding 5, Sankhuwasabha
33	Himalayan Organic Processing	Jogmai-5, Ilam
34	Himsikhar Tea Processing Industry	Deumai Municipality-1, Ilam
35	Ilam Star Tea Processing Industry	Phakphok-6, Ilam

36	Jasbire Tea Processing Industries	Maipokhari - 1 Jasbire, Ilam
37	Jhulke Ghaam Small Tea Producers	Suryodaya Municipality -11, Ilam
38	Kanyam Valley Small Tea Industry	Suryodaya municipality-15, Ilam
39	Kattebung Green Tea Pvt. Ltd	Paashupatinagar-2, Illam
40	Keshari Tea Garden	Eaktin -5 Chitre, Panchthar
41	Khima Organic Tea Processing Pvt. Ltd	Shree Antu-8, Ilam
42	Krishna Gopal Green Tea Processing Industries	Suryodaya Municipality -6, Ilam
43	Kulkule Tea Producer Cooperative Society Ltd.	Hamarjung 9, Terhathum
44	Lali Tea Production and Processing Cooperation Ltd	Phidim Municipality -3, Panchthar
45	Laligurash Handmade Tea Industries	Jitpur, Ilam
46	Lamandala Specialty Tea Pvt. Ltd	Pashupatinagar-1, Ilam
47	Lekali Tea Industries Pvt. Ltd.	Pauwasartap -7, Panchthar
48	Loksham Tea Processing Industry	Gorkhe-6, Ilam
49	Lumbini Tea Industries Pvt. Ltd.	Suryadaya Municipality- 10, Ilam
50	Madi Himali Orthodox Tea Processing Private Ltd	Madi Municipality 9, Sankhuwasabha
51	Maipokhari Organic Small Tea Industries	Sulubung -4 Ilam
52	Maipokhari Tea Processing Industry	Sumbhek-8, Ilam
53	Mangmalung Tea Estate Pvt. Ltd.	Banjo -4 Ilam
54	Matribhumi Tea Estate Pvt. Ltd.	Singhadevi-5, Morang
55	Mirmire Organic Tea Producers	Siddhithumka -3, Ilam
56	Miteri Organic Tea Processing Factory	Siddithumka, Ilam
57	Nava Arya Tara Tea processing	Sriantu-6, Ilam
58	Nepal Green Tea Specialty Pvt. Ltd.	Pashupatinagar-8
59	New Sagarmatha Roasted Green Tea Industry	Suryodaya Muniicpality -6, Ilam
60	Oasis Tea Processing Pvt. Ltd.	Suryodaya municipality-4, ilam
61	Panchakanya Tea Cooperative Ltd.	Hattkharka -6, Dhankuta
62	Panidhap Tea Processing Firm	Phakphok-6, Ilam
63	Pathibhara Tea Production Cooperative	Handewa -1, Taplejung
64	Pathibhara Orthodox Tea Processing Industry	Sankhejung-7 Ilam
65	Pathibhara Tea Estate Pvt. Ltd	Oyam -4 Panchthar
66	Rajarani Tea Producer Cooperative Society Ltd.	Rajarani, Dhankuta
67	Rasmina Tea Processing Center	Sulubung-5, Ilam
68	Ramche organic Tea Producer Cooperative Ltd.	Pakhribas, Dhankuta
69	Rong Tea Industry	Suryadaya Municipality 8, Ilam
70	Sagarmatha Tea Processing Industry	Suryodaya Municipality-6, Ilam
71	Sagarmatha Tea State	Tamaphok 8, Sankhuwasabha
72	Sandakfu Tea Processing Pvt. Ltd.	Maipokhari - 1, Jasbire, Ilam
73	Sanimai Tea Cooperative	Sulubung, Ilam

74	Sarada Tea State	Pashupatinagar -3, Ilam
75	Satthumke Tea Farmer Cooperative Ltd	Ektin -3, Panchthar
76	Shree Antu Gorkha Tea Industry	Sriantu-4, Ilam
77	Siddapokhari Tea Cooperative	Nayabazaar, Ilam
78	Siddhithumka Tea Producers Cooperatives	Siddhithumka -3, Ilam
79	Singhadevi Orthodox Tea Processing Industry	Deumai Municipality-1, Ilam
80	Solmali Laghu Uddhami Orthodox Tea Processing Firm	Laliguras-11, Terhathum
81	Suryodaya Organic Hand Made Tea Industry	Suryodaya Municipality-11, Ilam
82	Thamdada-Temke-Silichung Tea Cooperative Ltd.	Bhojpur
83	Tinjure Orthodux Tea Processors Pvt. Ltd.	Laliguras 11, Terhathum
84	Tinjure Tea Cooperative Ltd	Phakphok, Ilam
85	Trisakti Pathivara Tea Processing Pvt. Ltd.	Suryodaya Municipality-11, Ilam
86	Uchha Pahadi Tea Cooperative Ltd.	Sankhejung, Ilam
87	Yeti Tea Processing Industries Pvt. Ltd.	Suryodaya Municipality-4, Ilam

Appendix C: Financial Analysis Formats

Appendix C.1: Capital Investment

Activity wise budget	Unit	Rate (NRs)	Quantity	Total cost (NRs)
A. Investment in Civil works				
…….				
……..				
…….				
Sub Total				
B. Investment in Machineries Equipment				
…….				
……				
……				
…….				
……				
C. Investment in Software (Trainings)				
…….				
……				
Sub Total				
Grand Total				

Appendix C.2: Fixed Cost Calculation

Cost item	Unit	Rate	Quantities over 5 years period					Amount (NRs.)				
			2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
A. Staff Salary	Month											
…….	Month											
…….	Month											
…….	Month											
……...	Month											
B. Maintenance of Fixed Assets	Year											
Audit Fee	Year											
C. Electricity, communication etc	Month											
D. Stationary	Month											
E. Travel	Month											
F. Insurance (0.5% of fixed assets)	Year											
G. EMI	year											
Total												

Appendix C.3: Variable Cost Calculation

Cost items	Unit	Rate	Quantities over 5 years period					Amount (NRs.)				
			2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
A. Raw materials												
…..												
…..												
……												
B. Labors…												
C. Packaging cost												
D. Transportation and shipping cost												
E. Electricity												
F. Firewood												
G. Market promotion cost												
H. Others												
…….												
…….												
Total												

Appendix C.4: Depreciation Calculation

Particulars	Amount	No. of Years	Depreciation
Investment in land and infrastructure			
Investment in Machinery and equipment			
Total			

Appendix C.5: Revenue Analysis

Product	Rate/kg	Quantities (Kg.) over 5 years period					Amount (NRs.)				
		2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
Specialty tea											
Normal tea											
Fanning and dust											
Total											

Appendix C.6: Profit loss analysis

Particulars	2017	2018	2019	2020	2021
Revenues					
Variable cost					
Gross Profit					
Training					
Fixed Costs					
Depreciation					
Profit Before Tax					
Income Tax@20%					
Net Profit					

Appendix C.7: Basic Cash Flow Analysis

Items	**Period of time**				
	2017	**2018**	**2019**	**2020**	**2021**
Investment Costs					
Investment in Civil works					
…..					
…..					
……					
…..					
Investment in Machineries Equipment					
…….					
…….					
……..					
Investment in Software					
…….					
Total Investment					
Operating Cost					
Variable Costs					
Fixed Costs					
Interest on Loan					
Total Operating Cost					
Income Tax					
Total Cash Outflow (Investment+ Operating Cost+ Tax)					
Revenue					
Total Cash Inflow					
Net Cash Flow					
Cumulative Cash Flow					
Discount Factor (15%)					
Discounted Net Cash Flow					
Discounted Cumulative Cash Flow (Total Present value)					
NPV at 15%					
Payback Period					

Note:

- *The basic cashflow should include all the cash inflow and outflow from the business except for grant and capital contribution.*
- *The cash outflow from operating cost and cash inflow from revenues may differ from profit and loss account as profit and loss account are prepared on accrual basis (Based on transaction not on cash basis)*
- *Discount factor represents time value of money*
- *Net present value represents the actual worth of the project after considering the time value of money*
- *IRR represents the discount factor where the net present value is zero*
- *Payback period is the period in years for the project to return the investment made*

Appendix C.8: Balance Sheet

Particulars	2017	2018	2019	2020	2021
Assets					
Current Assets					
Cash					
Total Current Assets					
Long Term Assets					
Fixed Assets					
Less: Depreciation					
Net Fixed Assets					
Total Assets					
Liabilities					
Current Liabilities					
Short Term Loans					
Sundry creditors					
Total Current Liabilities					
Long Term Liabilities					
Long Term Loan					
Total Long-Term Liabilities					
Total Liabilities					
Equity & Reserve					
Paid-in-Equity					
Retain Earnings					
Grant					
Total Equity & Reserve					
Total Liabilities and Equity					

Appendix C.9: Break Even Point Calculation

Item	2017	2018	2019	2020	2021
Revenue					
Less: Cost of Goods Sold/Variable Cost					
Total Contribution					
Fixed Cost					
PV Ratio					
BEP (in Rs.)					

Appendix C.10: Ratio Analysis (Financial performance indicators)

Particulars	Period of time				
	2017	2018	2019	2020	2021
Gross margin (GM) %					
Net profit (NP) %					
Return on Assets (ROA)%					
Return on Investment (ROI)					

Basis for Calculation

- *Current Ratio= Current Assets/Current Liability*
- *ROA= (Net Profit after tax/Total Assets) *100*
- *GM= Gross Profit)/ Total Revenue*100*
- *NP = Net profit/ Total Revenue*100*
- *ROI= Net profit/ Investment*100*

Appendix D: List of Organic Certified Tea Processing Firms

SN	Name of processing firms	District
1	Singhadevi Tea Producer Cooperative	Terhathum
2	Tinjure Tea Farmer Cooperative Ltd.	Ilam
3	Nepal Green and Specialty Tea Pvt. Ltd	Ilam
4	Oasis Tea Industries	Ilam
5	Pathivara Tea Estate (P) Ltd.	Panchthar
6	Jasbire Tea Factory	Ilam
7	Sandakphu Tea Processors Pvt. Ltd.	Ilam
8	Siddha Devi Tea Estate Pvt. Ltd.	Ilam
9	Pathivara Orthodox Tea Factory	Ilam
10	Brothers Orthodox Tea Factory	Ilam
11	Green Hill Orthodox Tea Factory	Ilam
12	Jaubari Tea Estate Pvt. Ltd.	Ilam
13	Uchha pahadi Tea Cooperative	Ilam
14	Kanchanjangha Tea Estate and Research Center (P.) Ltd.	Panchthar
15	Kanchenjunga Organic Tea Factory	Ilam
16	Guranse Tea Estate P Ltd.	Dhankuta
17	Ilameli Tea Cooperative Ltd.	Ilam
18	Gorkha Tea Estate Pvt. Ltd.	Ilam
19	Mist Valley Tea Industries Pvt. Ltd.	Ilam
20	Himalayan Sangrilla Tea Producer Pvt. Ltd.	Ilam

Appendix E: Export and Import Trend of Nepal Tea with Projection (1999-2023)

Fiscal year	Production area (ha)	Production (metric ton)	Export quantity (kg)	Export value (000 NRs)	Import value (000 NRs)
1999/00	10249	5085	81600	25722	73277
2000/01	11997	6638	69500	23084	98000
2001/02	12346	7519	79600	27787	8838
2002/03	12643	8198	193000	53908	468
2003/04	15012	11651	884000	104822	992
2004/05	15900	12606	4316000	438771	419
2005/06	16012	13688	4623000	415632	5005
2006/07	16420	15168	7000000	734285	19000
2007/08	16594	16127	8600000	902122	13123
2008/09	16718	16208	8889000	1160593	9624
2009/10	17127	16608	8498000	1195319	36116
2010/11	17451	17438	10533000	1549891	40804
2011/12	18149	18310	11060000	1627589	47801
2012/13	19036	20588	10709000	2043220	57516
2013/14	20120	21076	11357000	2029439	55820
2014/15	26165	23187	11142000	2006877	93763
2015/16	27688	24264	13289000	2400119	67971
2016/17	28241	24409	11745000	2502765	90656
2017/18	28595	24804	15685000	3251686	120934
2018/19	27545	26938	16008202	2917146	120934
2019/20	28476	28034	16878739	3090473	120934
2020/21	29407	29130	17749277	3263800	120934
2021/22	30338	30226	18619814	3437127	120934
2022/23	31269	31322	19490352	3610454	120934

Source: Adapted from NTCDB, 2019

Appendix F: Country Wise Tea Export from Nepal

Importer	2014	2015	2016	2017	2018	Share value in 2018 (%)
World	7210.63	6855.8	6805.79	7096.02	7439.57	100
Pakistan	328.287	458.103	489.96	549.617	571.327	7.7
Russian	645.822	637.829	548.259	524.966	497.016	6.7
USA	467.328	468.841	483.122	486.565	487.294	6.6
UK	373.54	400.951	362.871	404.498	396.274	5.3
UAE	677.86	468.277	483.59	303.861	323.161	4.3
Egypt	344.799	289.76	282.341	273.807	318.109	4.3
Iran	257.874	239.183	261.129	282.691	292.357	3.9
Afghanistan	157.219	129.025	89.671	0	292.221	3.9
Saudi Arabia	250.505	254.004	256.432	263.159	252.516	3.4
Germany	237.358	225.925	226.491	227.917	229.817	3.1
Morocco	189.795	196.889	199.189	219.798	220.638	3
Viet Nam	7.93	9.162	10.9	10.803	182.405	2.5
Japan	189.701	174.021	165.139	177.335	182.118	2.4
France	172.075	165.462	161.589	168.658	180.786	2.4
China	92.073	105.594	111.498	149.13	177.824	2.4

Source: ITC calculations based on UN COMTRADE and ITC statistics.

Appendix G: Leading Green Tea Importing Countries from Nepal in 2018

Country	Quantity (Metric tons)	Value (USD)	Price ($/kg)
India	32.2	113920.0	3.5
Germany	6.6	108537.0	16.4
Malaysia	1.4	11715.0	28.2
U.S.A.	1.4	40608.0	24.6
France	1.1	33885.0	25.4
Japan	1.6	28013.0	7.3
Netherlands	0.9	10855.0	12.1
Czech Republic	0.4	9281.0	22.0
U.K.	0.4	5801.0	22.4
Poland	0.2	8969.0	23.4
Singapore	0.4	3319.0	14.0
Australia	0.1	5831.0	47.2
Korea R	0.1	1385.0	50.2
Bhutan	0.3	1595.0	12.2
Lithuania	0.1	4485.0	32.4
Canada	0.1	3613.0	15.5
Slovakia	0.1	1719.0	13.3
Denmark	0.0	1278.0	85.2
Taiwan	0.1	1206.0	8.5
Italy	0.1	647.0	7.4
China P. R.	0.1	179.0	3.5
Hongkong~ SAR of China PR	0.2	139.0	0.7

Source: TEPC, 2019

Appendix H: Leading Black Tea Importing Countries from Nepal in 2018

Country	Quantity (Metric tons)	Value (USD)	Price (US $/kg)
India	15116.7	25408181.0	1.7
Russia	147.2	359102.0	2.4
Germany	51.9	728958.0	14.0
U.A.E.	41.0	91737.0	2.2
China P. R.	31.9	99487.0	3.1
Ukraine	31.3	81223.0	2.6
Czech Republic	19.9	252038.0	12.6
Japan	12.1	113163.0	9.3
U.S.A.	5.2	108263.0	20.8
Canada	3.9	111408.0	28.8
France	2.2	53416.0	24.7
Netherlands	0.9	9588.0	10.3
U.K.	0.3	11735.0	38.6
Denmark	0.2	4514.0	22.7
Sweden	0.2	11149.0	64.8
Australia	0.1	2926.0	22.7
Austria	0.1	4156.0	34.6
Hungary	0.1	5053.0	49.1
Taiwan	0.1	1733.0	17.5
Singapore	0.1	1657.0	29.6
Poland	0.1	2550.0	48.1
New Zealand	0.0	512.0	16.0
Switzerland	0.0	1458.0	60.8
Norway	0.0	1027.0	85.6

Source: TEPC, 2019

Appendix I: World Tea Production from 2000 to 2017

Year	Production area (million ha)	Production (million metric ton)
2000	2.4	3.2
2001	2.4	3.4
2002	2.4	3.4
2003	2.5	3.5
2004	2.6	3.6
2005	2.7	3.9
2006	2.7	3.9
2007	2.9	4.2
2008	3.0	4.3
2009	3.0	4.3
2010	3.2	4.6
2011	3.4	4.8
2012	3.5	5.0
2013	3.6	5.3
2014	3.8	5.5
2015	3.9	5.8
2016	3.9	5.9
2017	4.1	6.1

Source: FAOSTAT, 2019

Appendix J: World Top Tea Producing Countries in 2017

Country	Quantity (tones)
China	1214005
India	967253.4
Kenya	329807.3
Sri Lanka	306648.7
Turkey	187471
Iran	179776.5
Indonesia	154362.3
Viet Nam	140710.5
Japan	87467.46
Myanmar	79612.38

FAOSTAT, 2019

Appendix K: World Tea Export and Import Situation (2000-2016)

Year	Import value (million US $)	Export value (million US $)
2000	2950.7	2923.8
2001	2823.5	2821.0
2002	2817.3	2864.7
2003	2950.7	2942.9
2004	3131.4	3288.1
2005	3347.7	3583.3
2006	3610.9	3750.7
2007	4240.9	4124.5
2008	5129.7	5531.2
2009	4997.6	5428.3
2010	5686.7	6401.7
2011	6628.8	6610.3
2012	6800.5	6316.8
2013	7139.8	7576.4
2014	7228.3	6852.4
2015	6872.5	6305.3
2016	6581.5	6345.2

Source: FAOSTAT, 2019

Appendix L: World's Leading Tea Exporting Countries (2014-2018)

(Value in million US dollars)

Exporter	2014	2015	2016	2017	2018	Share value in 2018 (%)
World	7803.30	7349.31	7477.44	8021.03	7761.48	100
China	1272.66	1381.53	1485.02	1609.96	1785.37	23
Kenya	1071.45	1248.74	1229.11	1424.43	1370.49	17.7
Sri Lanka	1609.34	1321.90	1251.73	1513.21	942.18	12.1
India	656.21	677.93	661.72	768.99	763.19	9.8
UAE	312.64	116.87	117.57	188.52	295.04	3.8
Germany	252.09	217.13	232.73	249.53	252.02	3.2
Viet Nam	227.72	212.42	225.41	206.92	225.08	2.9
Poland	237.01	180.80	194.41	189.03	203.14	2.6
Japan	75.21	85.94	108.92	129.92	142.24	1.8
UK	153.56	147.26	134.82	137.80	140.74	1.8
USA	107.80	110.36	128.04	135.85	124.42	1.6
Taipei	43.09	53.96	63.87	89.82	111.90	1.4
Indonesia	134.58	126.05	113.11	114.23	108.42	1.4
Russia	85.38	69.50	76.32	92.27	97.93	1.3
Malawi	77.38	66.82	67.30	71.56	91.60	1.2

Source, ITC Trade Map, 2019

Appendix M: World's Leading Tea Importing Countries (2014-2018)

(Value in million US dollars)

Importer	2014	2015	2016	2017	2018	Share value in 2018 (%)
World	7210.6	6855.8	6805.8	7096.0	7439.6	100
Pakistan	328.3	458.1	490.0	549.6	571.3	7.7
Russian	645.8	637.8	548.3	525.0	497.0	6.7
USA	467.3	468.8	483.1	486.6	487.3	6.6
UK	373.5	401.0	362.9	404.5	396.3	5.3
UAE	677.9	468.3	483.6	303.9	323.2	4.3
Egypt	344.8	289.8	282.3	273.8	318.1	4.3
Iran	257.9	239.2	261.1	282.7	292.4	3.9
Afghanistan	157.2	129.0	89.7	0.0	292.2	3.9
Saudi Arabia	250.5	254.0	256.4	263.2	252.5	3.4
Germany	237.4	225.9	226.5	227.9	229.8	3.1
Morocco	189.8	196.9	199.2	219.8	220.6	3
Viet Nam	7.9	9.2	10.9	10.8	182.4	2.5
Japan	189.7	174.0	165.1	177.3	182.1	2.4
France	172.1	165.5	161.6	168.7	180.8	2.4
China	92.1	105.6	111.5	149.1	177.8	2.4

Source: ITC Trade Map, 2019

Appendix N: World's Leading Green Tea Importing Countries from 2014 to 2018

(Value in Million US dollars)

Country	2014	2015	2016	2017	2018
Morocco	185.792	192.546	193.266	214.378	214.104
USA	116.947	132.464	143.729	149.053	171.549
Afghanistan	60.105	51.338	44.82	0	121.012
France	78.565	79.8	81.194	83.959	91.602
Germany	76.749	75.737	75.19	71.695	72.735
China	23.319	27.042	33.085	41.387	65.664
Algeria	30.139	32.347	33.983	32.58	50.477
Canada	42.722	38.921	41.66	47.447	48.925
Russia	64.775	57.495	50.979	44.049	46.173
Netherlands	24.789	25.781	29.608	32.655	37.773
UK	24.591	29.13	30.121	31.1	30.113
Malaysia	18.235	16.451	17.044	20.763	29.904
Japan	21.387	19.359	19.601	23.49	27.665
Belgium	30.838	21.942	23.156	23.464	23.724
Spain	15.26	14.983	18.012	19.147	23.37
Libya	13.363	15.99	10.293	24.231	23.268
Singapore	18.897	17.641	20.549	22.599	22.352
Italy	18.204	18.79	21.059	26.164	21.281
Mauritania	17.362	14.802	19.479	18.445	18.671
Australia	13.769	15.715	14.758	16.658	17.925
United Arab Emirates	40.669	34.667	36.666	17.168	16.708
Poland	19.015	15.906	16.2	17.527	16.495
Switzerland	9.156	9.257	10.125	11.103	10.979
Guinea	1.58	1.766	6.345	7.737	10.653
Czech Republic	10.102	8.513	8.489	8.982	8.87
Sweden	6.101	6.387	6.549	6.821	6.823
Denmark	5.225	4.997	7.337	8.135	6.295
Austria	7.268	6.206	5.455	5.506	6.087
Norway	5.037	4.002	3.598	3.979	4.323
World	1336.774	1360.894	1344.465	1377.961	1653.689

Source: ITC Trade Map, 2019

Appendix O: World's Leading Black Tea Importing Countries from 2014 to 2018

(Value in Million US dollars)

Country	2014	2015	2016	2017	2018
Pakistan	319.339	449.222	480.361	537.68	557.759
Russia	581.047	580.335	497.28	480.917	450.843
UK	348.949	371.821	332.749	373.399	366.161
China Mainland	182.792	193.824	205.68	266.203	318.099
USA	350.381	336.377	339.393	337.511	315.745
Egypt	338.374	280.494	277.995	270.627	313.262
UAE	637.191	433.61	446.924	286.693	306.453
Iran	256.267	237.374	259.208	280.128	290.571
Saudi Arabia	240.819	241.413	245.126	254.118	241.098
Germany	160.609	149.809	151.301	156.222	164.178
Japan	168.314	154.662	145.538	153.844	154.452
Kazakhstan	123.779	106.048	108.024	118.351	108.021
Poland	94.4	89.607	86.987	96.505	100.06
Canada	105.041	94.858	99.315	102.13	96.751
France	95.119	86.151	82.09	85.515	89.334
Australia	100.083	89.207	83.907	89.757	85.542
Netherlands	87.488	75.255	80.836	83.164	84.415
Iraq	53.335	123.12	118.132	160.134	65.421
Yemen	50.101	31.716	46.703	63.554	59.354
Italy	61.123	54.844	59.816	54.613	56.699
Chile	55.26	51.032	44.096	49.871	53.618
Jordan	42.864	44.404	42.642	49.412	51.76
Belgium	55.062	55.955	54.921	55.422	51.486
Azerbaijan	18.611	15.939	43.604	52.927	48.874
World	5876466	5495713	5467279	5668290	5642769

Source: ITC Trade Map, 2019